THE IRON AGE

New York, April 7, 1921

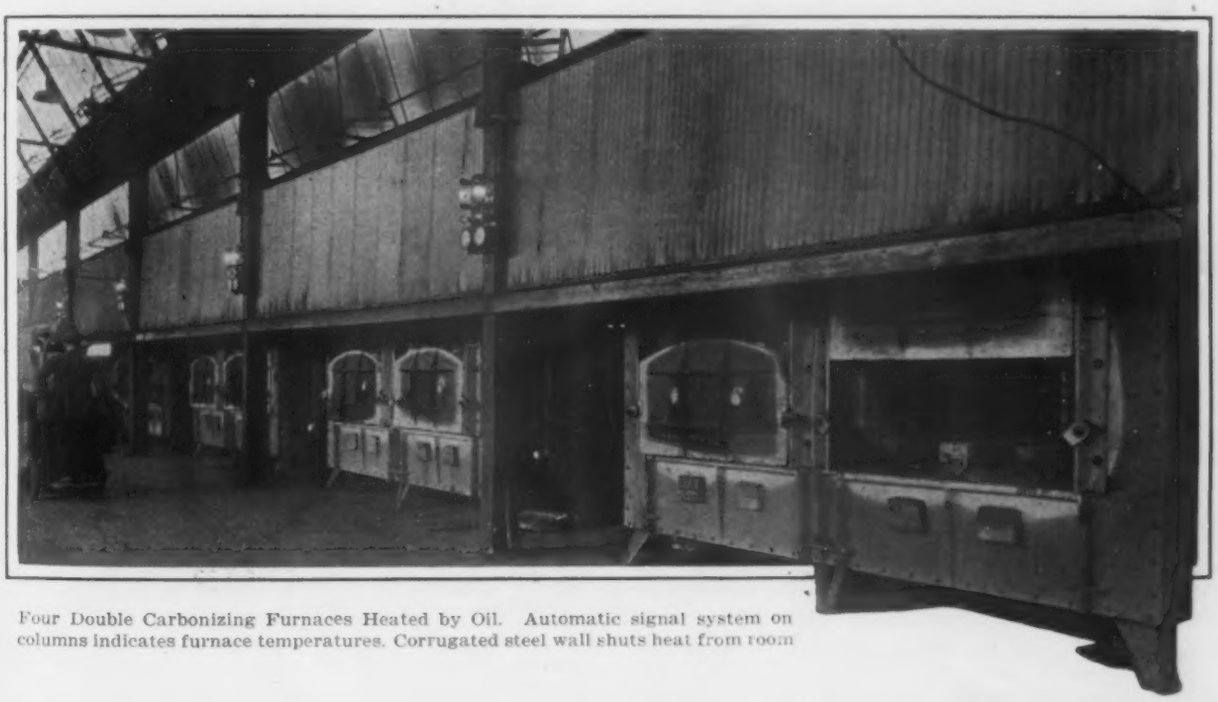
ESTABLISHED 1855

VOL. 107: No. 14

Heat Treating Plant at Nash Motor Works

Refining and Carbonizing Furnaces as Well as Compound Mixing and Conveying Equipment Conserve Labor and Increase Accuracy of Work

TO be used exclusively for the heat treatment of roller bearings, a plant unit recently completed for the Nash Motors Co., Kenosha, Wis., has several points of interest. Outstanding features in the equipment are an electric heat treating furnace, a mixing and conveying system for handling carbonizing compound and four double-oven oil-fired carbonizing furnaces. The design of the plant and the nature of the equipment are such as to reduce manual labor to a minimum, and greatly to increase the possibilities for accurate work.



Four Double Carbonizing Furnaces Heated by Oil. Automatic signal system on columns indicates furnace temperatures. Corrugated steel wall shuts heat from room

Designed and constructed by the George J. Hagan Co., Pittsburgh, the heat treating furnace, which is entirely automatic in its operation, is the first installation of its kind. It is especially adapted to the hardening of small parts. The roller bearings to be refined are received in a feed hopper by chute from a magnetic separator. From the hopper they are fed at intervals by a motor-driven feed wheel into a hoisting bucket serving the furnace. When the weight of the hoisting bucket reaches a predetermined amount, a weighing device trips and stops the motor. The bucket is then automatically raised to the top of the furnace, where it delivers its contents through a trap door into a charging chute. As the door is counterbalanced, it closes automatically immediately after the charge has passed through it.

Square in cross-section, the furnace has exterior walls of sheet steel and interior of fire brick and sil-o-cel lining. Six tilting buckets, arranged in zigzag fashion one above the other, convey the roller bearings from the top to the bottom of the furnace during the process of refining. The material is passed through at a uniform rate, and in dropping from one scoop to the next is thoroughly mixed. The buckets and their supporting shafts, as well as the elements which furnish the heat, are made of nichrome, an alloy able to withstand the intense heat which obtains during the operation. A 1-hp. General Electric Co. a.c. motor drives the train of gears, the tripper chains and the pulleys which control the mechanical operations of the furnace. Each operation is so timed that it takes place at the proper interval in relation to other operations.

Periodic Charging of the Heat-Treating Furnace

The hoisting bucket delivers a charge into the furnace every 7½ min. The time of each heat is 45 min., there being six tilts from bucket to bucket during that period. The shafts carrying the buckets extend through the walls of the furnace, each being fitted with a

crank on one side and a counterbalanced weight on the other. A tripper chain driven by gears from the motor is fitted with fingers which engage the cranks at timed intervals, tilting the buckets momentarily so that their contents are passed to the buckets immediately below. When the cranks are released the buckets are returned to normal position by the counterbalanced weights on the other end of the carrying shafts.

In a similar manner the discharge door of the furnace is opened and closed to permit the contents of the bottom bucket to drop into a concrete quenching tank located immediately below the furnace. Two compartments have been provided in the tank, so that charges may be quenched in either oil or water, a trap under the discharge door being manually adjusted to direct the charge into either compartment, as desired. Each half of the tank is equipped with a chute down which the charge is conveyed to a bucket. At timed intervals the bucket is raised and automatically dumped into a receiving tray resting on the floor adjacent to the tank.

Connected into a 440-volt single-phase a.c. circuit, the heating elements of the furnace have a maximum consumption at full load of 36 kw. The thermocouples are connected with a Leeds & Northrup recording regulator of the potentiometer type, which automatically controls the temperature, and also limits the power consumption to the actual requirements of the material being heated. The normal refining temperature used for the roller bearings is between 1475 and 1500 deg. Fahr., but by adjusting the regulator any desired temperature can be obtained. Not only is the furnace temperature subject to adjustment, but the rate of travel of material through the furnace may be altered, and the size of the charge varied, by adjusting the automatic weighing mechanism.

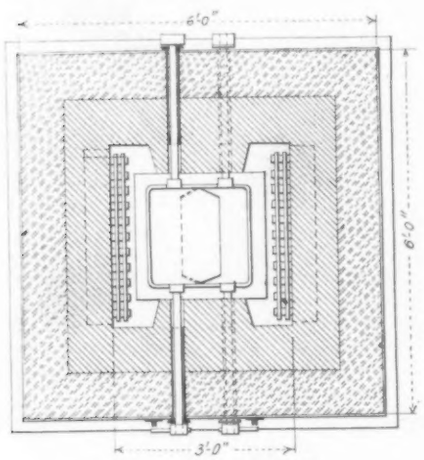
The furnace is new and there is no past experience on which to gage its length of service, but it is estimated that it will not require relining for at least two years. Access to the interior may be gained by unbolting the top of the furnace shell.

Carbonizing Done in Oil-Fired Furnaces

Four double-oven oil-fired furnaces built by the Strong, Carlisle & Hammond Co., Cleveland, are used to carbonize the roller bearings. The furnaces were constructed complete in the manufacturer's plant, so that when delivered at Kenosha they were practically ready for operation. All that remained to be done was to remove the wooden skids fastened to the base and to make one air and one oil connection for each furnace of two ovens, as all castings, brick and tile were permanently assembled before shipping. The total shipping weight of each furnace was 60,000 lb. The purchase was handled through the Federal Machinery Sales Co., Chicago.

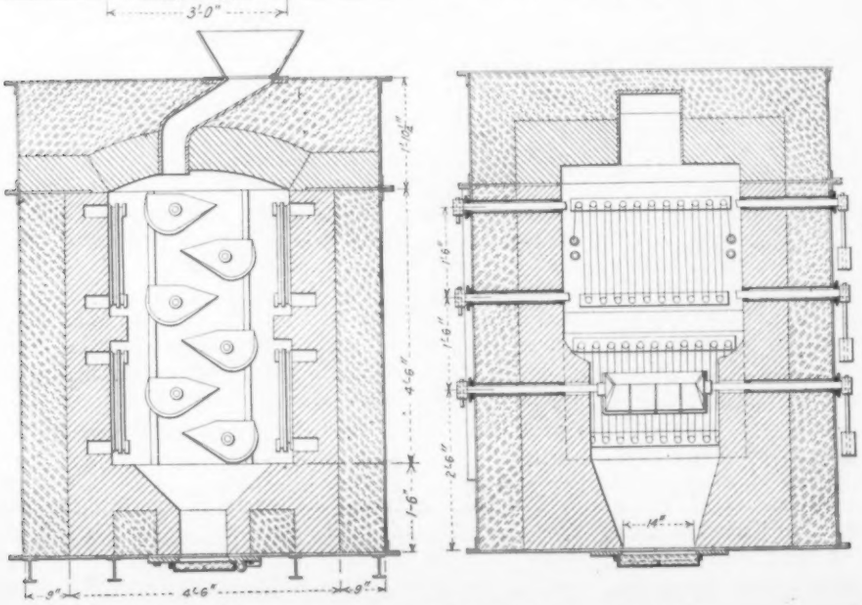
Heavily insulated, and encased in a cast-iron shell, the furnace walls are of brick, 13½ in. thick. As a result of the insulation the iron shell is practically at room temperature when the furnaces are operating at 1675 deg. Fahr., thus indicating a material saving in fuel. The working tile of the furnace is provided with three fire clay ribs running lengthwise of each oven; the carbonizing boxes rest on these ribs during the heating process.

The problem of handling the charges was solved by William Silcock, plant engineer, Nash Motors Co., who adapted a Lakewood Engineering Co. elevating truck to the work. The elevating bed of the truck consists of two long fingers which fit into the interstices between the ribs of the oven, and thus may be withdrawn after the boxes have been deposited across the ribs. Ordinarily, a battery of eight ovens would require a crew of four men, who would consume about twenty minutes in unloading and loading each furnace. Through the use of the elevating truck one man does all of the work, unloading and charging a single furnace in from two to three minutes. This labor-saving scheme also conserves heat, as unloading takes two minutes or less, following which the furnace door is closed until the truck returns three minutes later with another charge. An incidental advantage of the rib design is that it saves the floor tile of the furnaces from wear. In loading and unloading by means of the truck, the carbonizing boxes are lowered to and lifted from the ribs instead of being shoved and dragged with a fork, as is the usual method.



Horizontal Cross Section

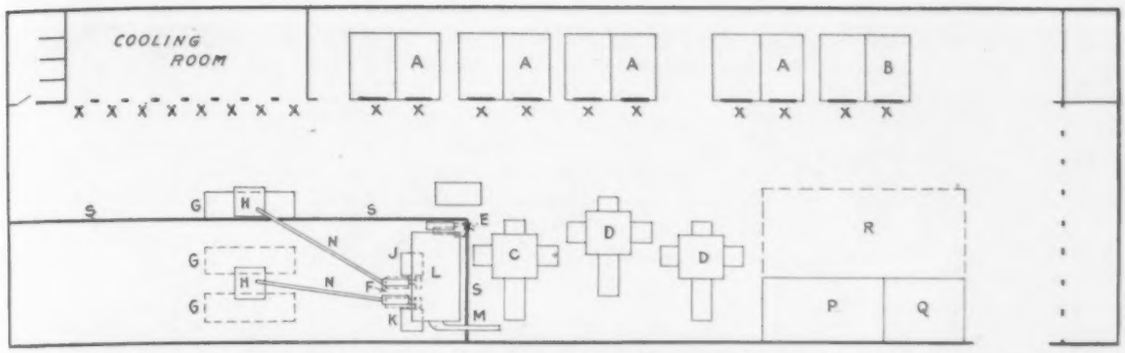
Automatic Electric Heat-Treating Furnace for Hardening Small Parts Such as Roller Bearings. The pieces, charged through hopper at top, pass at predetermined intervals from one bucket to that next below and finally out at the bottom, being all the while subjected to heat from the electric heating elements shown



Vertical Cross Sections at Right Angles to Each Other

How the Furnaces are Heated

Each furnace oven is heated with three Strong, Carlisle & Hammond low-



Plan of Heat-Treating Plant, with Line of Mezzanine Floor Shown at *SSS*. *A*—Four double-oven carbonizing furnaces, with future furnace at *B*. *C*—Electric heat-treating furnace, with two future furnaces at *D*. *E*—Elevator for contents of carbonizing boxes. *F*—Elevators for mixed coarse and fine compounds. *G*—Packing stations. *H*—Final fine and coarse compound hoppers serving packing stations. *J*—New fine compound hopper. *K*—New coarse compound hopper. *L*—Magnetic separator. *M*—Chute to electric furnace. *N*—Elevators. *P*—Pyrometer room, 8 x 16 ft. *Q*—Office, 8 x 11 ft. *R*—Space for proposed tool-hardening furnaces

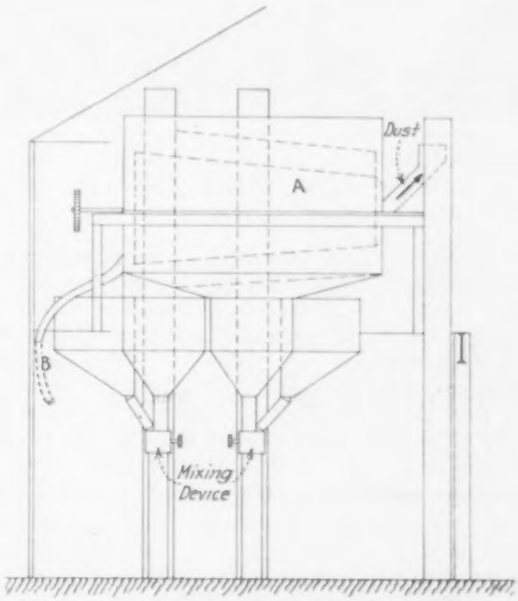
pressure oil burners, all three of which feed from one side of the furnace. The air for the burners, preheated in a tank over the furnace ports, is supplied for combustion at a steady pressure of 1 lb. by a Spencer turbo-blower. To obtain complete combustion the flame from the burners enters a combustion chamber below the working tile. The heat—not the flame—rises along the sides of the tile and soaks through it, being reflected on the work from the walls and arch of the furnace. The arch of each oven is provided with ribs running crosswise over the ribs of the working tile. These arched ribs tend to keep the heat circulating in one direction and to pocket it in parallel channels, at the same time increasing the radiating surface of the arch. After the furnace is up to working heat the middle burner is shut off. Because of the expeditious method of loading and unloading the boxes, heat losses from the ovens are materially reduced. The drop in furnace temperature averages less than 250 deg. Fahr., and it requires about 25 min. to bring the oven back to working temperature after the hot boxes have been removed and the cold boxes charged.

Each oven is provided with two thermocouples, one through the front of the arch and the other through the center of the back wall. Temperatures from these couples are recorded on a chart by a two-point Leeds & Northrup graphic potentiometer. The chart generally shows two coinciding red lines, indicating uniform temperature throughout the oven, which is 4 ft. wide by 6 ft. deep by 22 in. high. The advantage of uniform heat is that each carbonizing box is case hardened to the same depth and there is no spoiled work, such as obtains in ovens with "cold spots."

A Leeds & Northrup automatic signal system supplements the recording potentiometers. When the temperature of a furnace is below normal, a blue electric light is illuminated; at normal a white light shows, while above working temperature a red light shines. A clock dial has been provided on each furnace so that the hands may be set for the time of starting and completing a heat.

The carbonizing furnaces are located in a lean-to, which is separated from the heat treating building proper by a corrugated sheet wall extending down from the roof to a point just above the furnace doors. This arrangement tends to keep any escaping heat—as for instance during charging—out of the working room. Cooling stands for the hot boxes are also located in the lean-to, for the same reason. The position of the stands and their construction are such as to permit their being loaded and unloaded by elevating truck from the workroom.

The average time of carbonizing is 9 hr. from a cold furnace and 7½ hr. from a hot furnace, and it is to be noted in this connection that the saving in time through the truck method of charging and unloading

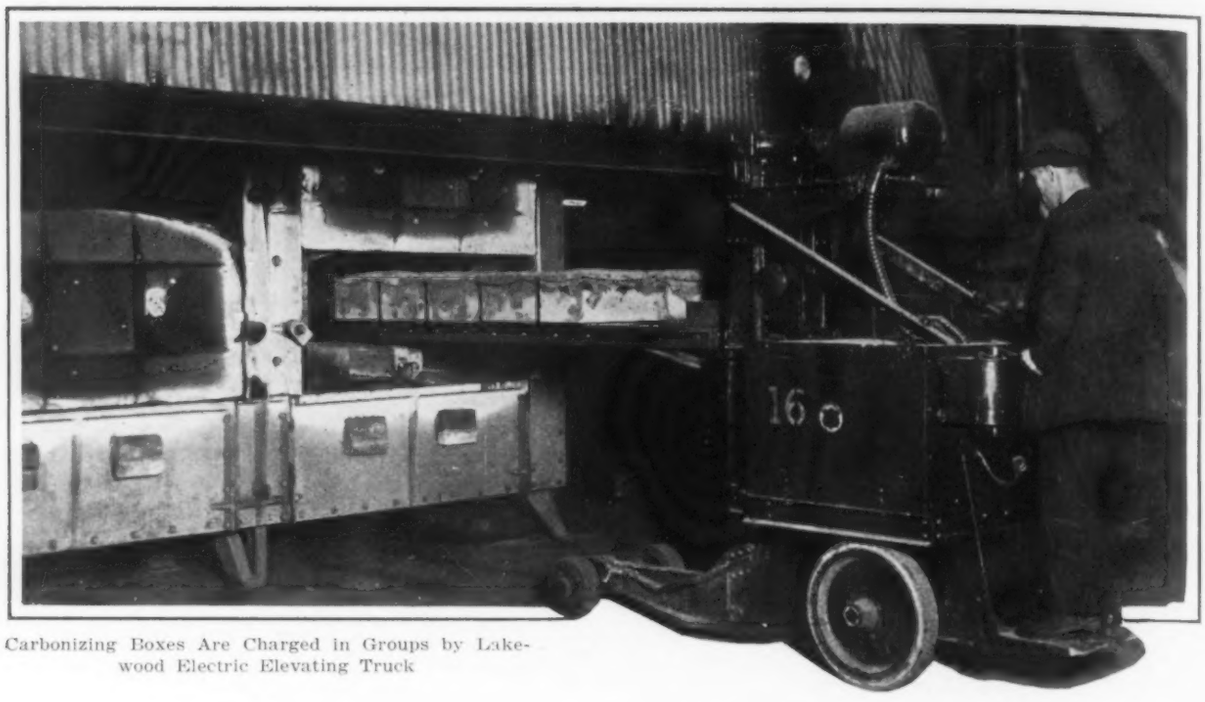


Cross Section of Magnetic Separator and Discharge Chutes and Hoppers for Old and New, Fine and Coarse Carbonizing Compound. *A*—Magnetic separator with double screen for coarse and fine compound. B—Chute for conveying roller bearings to electric heat-treating furnace

materially increases the working capacity of the ovens. It is estimated by the Nash management that if hand labor were used, another double-oven furnace would be necessary to turn out the same amount of work. The carbonizing capacity of the four furnaces is approximately four hundred sets of roller bearings (13 bearings per set) a day, while the electric furnace refines 175 to 200 sets in that period. The plant has been laid out to provide for the installation of an additional double carbonizing furnace and two more electric furnaces, which will insure a total daily output of 500 carbonized and refined sets of roller bearings.

Ingenious Scheme for Handling Carbonizing Compound

After carbonizing boxes have cooled they are dumped into a bucket elevator and their contents are carried up to a revolving magnetic separator and screen, furnished by the Magnetic Mfg. Co., Milwaukee. In this device the roller bearings are separated from the carbonizing compound and discharged into a chute leading to the feeding hopper of the electric furnace. At the same time coarse and fine compound are separated and delivered to different chutes, while dust is carried off to a cyclone and discharged by chute to the floor. New coarse and fine material are added to the old compound through two hoppers and chutes which connect with the discharge chutes for the screened coarse and fine compounds respectively. Each of these chutes is equipped with a mixing device so set as to



Carbonizing Boxes Are Charged in Groups by Lakewood Electric Elevating Truck

mix the new and old compound in the proportions desired. The mixed material passes by gravity to the floor, where it is picked up by bucket elevators and lifted to the final hoppers and chutes serving the box-packing stations.

Carbonizing compound is stored in bags on a mezzonine floor above the packing benches. The new compound is delivered by railroad from a switch track alongside the plant. When a shipment arrives, the continuous sash next to the mezzanine floor is lifted and the bags are taken direct from the railroad cars. On this floor also are located the hoppers into which the new coarse and fine material are discharged for mixing with the screened compound, and the final hoppers which deliver the mixed compounds to the packing benches.

This method of handling compound was worked out by Mr. Silcock, who also designed all of the mixing and conveying equipment with the exception of the magnetic separator.

Organizing Advisory Committees

WASHINGTON, April 5.—Organization of advisory committees from business and trade organizations to co-operate with the Department of Commerce is proceeding satisfactorily, it has been announced. A. W. Shaw of Chicago, publisher of *System*, and former chairman of the conservation division of the War Industries Board, is working with Mr. Hoover as a voluntary aid in assisting in the organization of these committees, as is a subcommittee from the Chamber of Commerce of the United States, which will give its ideas as to the selection of committees from trade associations. While the iron and steel trade is to be represented through the advisory committees, it probably will not be included in early discussions. It is the view of some officials that the iron and steel is so well organized that it is more capable than others, with one or two exceptions, to take care of itself in maintaining and increasing its export business.

Industrial Cost Association

The subject of "Idle Plant Facilities" has been selected for discussion at the April meetings of the sections of the Industrial Cost Association. A paper on the subject is being prepared jointly by T. W. Dinlocker, assistant comptroller S-K-F Industries, Inc., New York, and A. W. Wainwright, works auditor S-K-F Ball Bearing Co., Hartford, Conn. Copies of the paper will be distributed at the April meetings for reading and discussion. The discussions will be recorded and forwarded to the central office for digest; the whole thing will then be printed and distributed to the members.

M. F. Simmons, General Electric Co., Schenectady, N. Y., president of the association, in a letter to the membership on March 28, announces that A. A. Alles, Jr., has volunteered to act as permanent secretary, giving the association his undivided attention. "He has tendered his resignation as secretary of the Faweus Machine Co., which they have not seen fit to accept. He has, however, been granted an indefinite leave of absence, and is now on the job for us at Pittsburgh." The association's headquarters are in the Peoples Bank Building, Pittsburgh.

Stoker Manufacturers' Association

The Stoker Manufacturers' Association will hold its annual meeting this year at the Red Lion Inn, Stockbridge, Mass., May 24, 25 and 26. For some time the engineering committee has been working on a universal coal analysis. It has also given considerable thought to the subject of a standard minimum setting height for each type of boiler. These matters, together with many others of considerable interest to the association, will be brought up and discussed at the meeting.

Named Commissioner of Patents

WASHINGTON, April 5. — Thomas Robertson of Maryland has been named by President Harding as Commissioner of Patents. It is claimed that there is considerable opposition to Mr. Robertson and that a contest may develop in the Senate over his confirmation.

At the annual meeting of the Cleveland branch of the National Metal Trades Association, held March 30, A. W. Foote, the Foote-Burt Co., was re-elected president; P. A. Geier, P. A. Geier Co., was elected vice-president and E. J. Stahl, Baker R & L Co., was elected treasurer. The following new executive committee was named: Franklin Schneider, Van Dorn & Dutton Co., C. J. Fitzpatrick, Cleveland Worm & Gear Co., C. L. Collens, Reliance Electric Co., and George D. Kirkham, Harris Automatic Press Co.

Open-Hearth Furnace Waste Heat Utilization*

Coal Saving Equivalent of Recovery from Furnace Gases — Boiler Design an Important Item—Temperatures a Feature

BY G. R. McDERMOTT AND F. H. WILLCOX

THE term waste heat is inclusive of the total heat left in gases of combustion when they have served their primary purpose of roasting, reducing, oxidizing or heating in industrial or metallurgical furnaces or kilns. Furnaces employing regeneration or recuperation commonly have left in the gases of combustion, leaving the furnace, from 35 to 55 per cent of the total heat available in the fuel fired. Non-regenerative furnaces may have as high as 80 per cent of heat in the fuel escaping in waste gases of combustion. Kilns, oil stills, glass tanks, water gas sets, etc., all present, on account of the amounts and temperatures of escaping gases of combustion, amounts of waste heat that are not only recoverable but that give returns which will net from 25 to 75 per cent in one year on the installation cost of the equipment.

It is to be noted that prior waste heat boiler installations had to do with waste gases at temperatures of 1600 deg. Fahrenheit and higher. It had hitherto been considered impracticable to generate steam commercially with gases below this temperature. For waste heat boilers prior to this time the accepted deviation from hand-fired types was an increase in the gas passage area. The work of C. J. Bacon, formerly steam engineer Illinois Steel Co., South Chicago, demonstrated that for gas temperatures under 1600 deg., the gas passages should be decreased and as a corollary the velocity of gases increased.

Source of Gases from an Open-Hearth Furnace
Typical Heat Data

Size of heat (ingots)	75	tons
Charge: Hot pig iron	42.75	tons
Cold pig iron	.57	tons
Iron scrap	6.10	tons
Steel scrap	32.50	tons
Ore	14,200	lb.
Limestone	15,100	lb.
Dolomite	5,265	lb.
Fluorspar	762	lb.
Silicon (10 per cent)	262	lb.
Coal charged at producers	23.7	tons
Time of heat	9 hr. 25 min.	
CO_2 content of waste gases	13.0	per cent
Temperature of waste gases from checkers	1,300	deg. F.
Heat value of coal	10,800	B.t.u.
Pig iron	56.0	per cent
Scrap	36.8	per cent
Ore	7.2	per cent

Where the Gas Comes From

The gas-producing elements of the charge are the pig iron with 4.35 per cent carbon, 0.85 per cent silicon and 1.75 per cent manganese; the limestone with 42 per cent carbon dioxide; and the coal with the following analysis:

Carbon	60.10 per cent
Hydrogen	4.36 per cent
Nitrogen	1.18 per cent
Oxygen	10.97 per cent
Sulphur	1.42 per cent
Ash	8.43 per cent
Moisture	13.54 per cent

The steel scrap charged is considered a neutral component, being essentially of the carbon and metaloid content of the steel produced. The dolomite and fluorspar contribute negligible amounts of carbon dioxide to the gases. The ore charged, averaging 89 per cent ferric oxide, is significant in that the oxygen available therein for combining with the carbon of the pig iron reduces the amount of air with its nitrogen diluent, otherwise required for oxidation.

In determining the amount of gas available per hour for steam generation the authors analyze the open-hearth practice of the plant and show finally a total of 7509 lb. of gas for each ton of ingots produced by the furnace. The analysis and sources of this quantity of gas are shown in the following table:

Analyses of Total Waste Gases (Dry, No Air Dilution)

Item	From	Pounds per Ton of Ingots		By Weight	By Volume
CO_2	Charge	308			
CO_2	Coal	1540			
			1848	27.4 per cent	19.2 per cent
N_2	Charge	477			
N_2	Coal and Combustion	4416			
			4893	72.6 per cent	80.8 per cent
H_2O	Coal and Steam	768	768		
Total			7509		

The CO_2 content of 13 per cent in the stack gases as compared to 19.2 per cent in gases from charge and coal undiluted with air indicates an addition of air of 47.5 per cent to the gases. This is in part supplied through the ports and in part by leakage at the doors, ports and checkers. The indicated addition of 47.5 per cent air to 7509 lb. gas will total 3591 lb. of air per ton of ingots, giving 1848 lb. CO_2, 833 lb. of oxygen, 7651 lb. nitrogen, and 768 lb. moisture, or a total weight of gases of 11,100 lb. Per hour we have 88,500 lb. of gas. As an approximate check on these quantities of gas one may divide the total carbon in coal, pig iron and limestone, or 503 lb., by the carbon in one cubic foot of waste gas containing 13 per cent CO_2, or 0.044 lb. This gives us 91,000 lb. per hour.

At 1300 deg. Fahr. there are 26,000,000 B. t. u. in the waste gases, as against 60,000,000 B. t. u. in coal charged, or 43 per cent of total heat charged, equivalent to 2400 lb. of coal per hour. As will be seen, 1270 lb. of coal equivalent can be recovered per hour in a waste heat boiler.

Radiation and Convection

Many experiments have shown that the heat absorbed by radiation is proportional to the fourth power of the absolute temperature difference between the radiating surfaces. Contrasting a stoker-fired boiler with combustion chamber at 2700 deg. Fahr. (3160 deg. absolute) with waste heat boilers at 1300 deg. Fahr., initial temperature (1760 deg. absolute), the ratio of absorption by radiation would be about as 10.5 is to 1.

Ordinarily about 65 per cent of total evaporation is by radiation and 35 per cent by convection, so that on a 600-h.p. boiler 7,025,000 heat units are absorbed by convection and 13,050,000 heat units by radiation. In the waste heat boiler but 1,300,000 heat units can be absorbed through radiation, leaving 18,700,000 to be absorbed by convection. Obviously the rate of heat transfer by convection must be, for the waste heat boiler, 2.75 times as great per square foot of heating surface.

Even this hypothetical ratio does not state the handicap imposed upon waste heat boiler heat absorption, because the heating surface exposed to the direct heat of the furnace is less than in the case of a direct fired boiler. Obviously for a given gas weight, starting in with initial temperatures of 2700 deg. Fahr. and 1300 deg. Fahr. respectively, passing through or past an identical heating surface of a boiler, and having identical exit temperatures, the net amount of heat absorbed by convection by the heating surface must be much greater for the waste heat boiler with initial temperature of 1300 deg. Per square foot of heating surface of the boiler, therefore, the heat transferred by convection must jump to a figure hitherto considered impracticable.

This point of view is not always appreciated. It

*Abstract of a paper presented before the Western Society of Engineers, Nov. 15, 1920.

is not infrequently felt that, since a low temperature waste heat boiler gives but 70 to 80 per cent of builders' rating, the heat transfer rate is low. Actually it is very high. An increase in heat transfer rate is accomplished by an increase in velocity.

Waste Heat Boilers and Their Tubes

The trouble with the usual fire-tube boiler, especially when used for waste heat applications, is that the area for the passage of gases is too large and there is not sufficient length of travel for the gases. These objections are, of course, overcome by making a long boiler of small diameter or, what amounts to the same thing, dividing the boiler into two or more passes. The matter of tube size is also a large factor and if the question of cleaning were not of such real importance, the tubes could to great advantage be as small as locomotive tubes or even smaller. Waste heat boilers used in Europe in connection with gas engines have tubes of only an inch or so in diameter.

By thus increasing the velocity of gases over the heating surface, the rate of heat transmission may be raised to a point as high or even higher than exists in the case of water-tube boilers.

The three conditions conducive to high heat transfer rates are:

(a) High velocity of gases.
(b) Small size of boiler tubes.
(c) Clean heating surface on both the water and gas sides.

As usually built, the Bacon boiler consists of two vertical cylindrical shells, containing a large number of small tubes electrically welded into the heads. The diameter of the tube is kept as small as possible with regard to cleaning and the length is determined mainly by the space available and the friction loss. The object is to insure that the gases have a long travel at high velocity. In some cases it is found desirable that the average velocity exceed 100 ft. per second, for the purpose of preventing dust from lodging and to give a high rate of heat transmission. The waste gases enter the gas box at the bottom of the first pass and then go upwards through the tubes and into the transfer flue, which directs the flow downward through the second pass. In some cases a third pass is provided, acting as an economizer.

As a rule natural draft is not sufficient, because the gases leaving the boilers have been cooled to 450 deg. or 500 deg. in the attempt to recover as much of the heat as possible. On this account, and because of the intensity of draft required for operating the industrial furnaces and for drawing the bases through the boiler, it becomes necessary to use induced draft fans. When properly installed and driven, the fans prove a very advantageous accessory from the standpoint of better control of the operation of the heating furnaces, and with correctly selected turbine drive the exhaust steam suffices to heat the boiler feed water.

Savings Expressed in Tons of Coal

Details are given of tests made in 1918, as a result of which is was estimated that the possible saving (or recovery) per ton of steel produced was 200 lb. of coal. As this is equivalent to about one-third of the amount of coal required in producers in making one ton of steel, the magnitude of the saving becomes very apparent. The authors give the fuel equivalent for the first six months of 1920, month by month, varying from 7952 tons in January to 9710 tons in May. The average of the six figures given is 8790 tons per month.

Meeting of Southern Ohio Iron and Coke Association

The April meeting of the Southern Ohio Pig Iron and Coke Association will be held at the offices of M. A. Hanna & Co., Cleveland, on April 18. The business meeting will be held at 9.30 a. m. In the afternoon, at 2 o'clock, there will be a joint meeting of the association with the Cleveland Chemists and Ore Samplers, and in the evening there will be a triple meeting of the association, the Cleveland Chemists, and the Ohio branch of the American Institute of Mining and Metallurgical Engineers, at which moving pictures of the manufacture of pig iron and steel will be exhibited.

Members of the Southern Ohio Pig Iron and Coke Association are desirous of having any representatives of users of lake ores with them at their meeting on the afternoon of April 18, when questions of great interest will be discussed.

One Plant's Use of Motion Pictures

The uses which a manufacturer can make of moving picture films are set forth in an article in *Moving Picture Age* by Harlow P. Roberts, advertising manager Emerson-Brantingham Implement Co., Rockford, Ill., the author basing his statements on experiences in his plant. The first films of the company took up the various steps in the manufacture and assembly of equipment. The workings of a large factory, the complicated machines and the accurate results obtained proved to be revelations to the uninitiated.

The next set of films showed how the company's tractors could be used. The manager owns a Universal motion picture camera and whenever he heard of a new use for the tractor he journeyed to the spot and photographed it. It is pointed out that the moving picture showing of such novel uses is much more satisfactory than attempting to demonstrate them at first hand, as the tractor is usually not performing when the prospective customer is present.

Three reels were made on the operation, care and repair of the tractor, which not only helped present owners, but encouraged prospective ones as well, pointing out to the latter the simplicity of the machinery. The advertising features of the films are kept in the background and hence audiences in motion picture theaters and other assembly places are receptive.

Educational and industrial films are also shown to the employees for entertainment and improvement. Moving pictures taken of the employees' picnic have helped morale.

Drop Forge Meeting in Chicago

For the annual joint convention of the American Drop Forge Association and the Drop Forge Supply Association, which will be held this year in Chicago, June 22, 23 and 24, the following joint committee in charge of entertainment and general arrangements for the convention has been appointed:

For the American Drop Forge Association: Samuel M. Havens, chairman, Ingalls-Shepard Forging Co., Harvey, Ill.; W. E. Crocombe, Ajax Forge Co., Chicago..; Thomas P. Octigan, Octigan Drop Forge Co., Chicago.

For the Drop Forge Supply Association: C. H. Hallgath, chairman, Western sales manager N. & G. Taylor Co., 208 South La Salle Street, Chicago; A. L. Guilford, manager Chicago office Ajax Mfg. Co., Chicago; R. S. LeBarre, general sales manager, alloy division, Interstate Iron & Steel Co., Chicago.

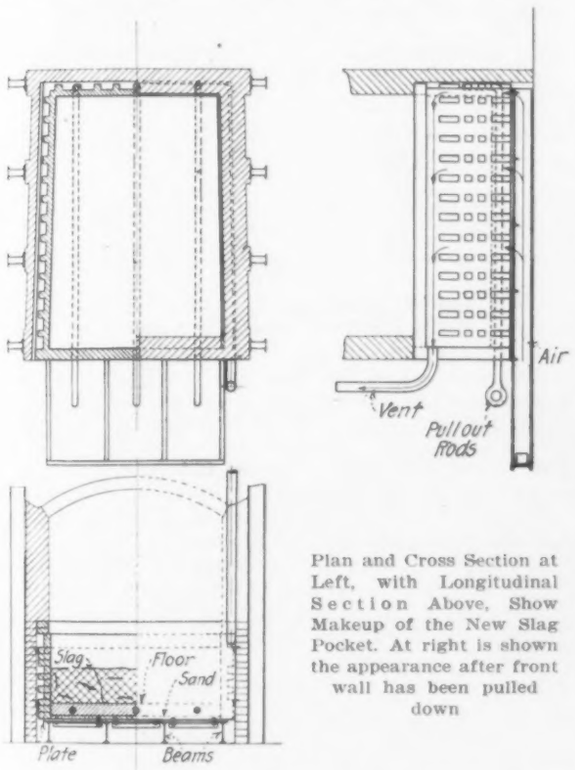
Previous meetings have been held as follows: 1920, Atlantic City, N. J.; 1919, Pittsburgh; 1918, Buffalo; 1917, Cleveland; 1916, Philadelphia; 1915, Pittsburgh; 1914, Chicago; 1913, Detroit.

To what extent cleaning influences production and quality is the subject of the prize story contest arranged by the Oakley Chemical Co., 22 Thames Street, New York. The winner is to receive $500. Twenty-eight others will receive less cash prizes. Stories are to be written from the viewpoint of one in the metal, textile or other industry and the contest will close July 1. The judges will be: Edward K. Hammond, associate editor *Machinery;* John H. Van Deventer, editor *Industrial Management;* Clarence Hutton, technical editor *Textile World Journal,* and C. F. Radley, editor *Oakite News Service.*

AIR-COOLED SLAG POCKETS

Removable Type Permits Ease of Handling and Saves Labor

Experience with water-cooled and other types of slag pockets for open-hearth furnaces have led to numerous designs, the success of which has not always been commensurate with the expenditure and the cost of upkeep. In types having inserted water cooling pipes back of a 4½-in. wall, there is no assurance that this method will be effective, for should the water cease to flow the scouring action and the heat of the slag may prevent the further use of the pipes. Because of this possibility the cooling pipes have generally been put back of thick walls, thus lessening the cooling effect. The arrangement of water-cooled buckstays will produce the same effect as inlaid cooling pipes, but will give only local cooling. A renewable slag buggy has been used for this purpose, but due to its height it reduces the capacity of the pockets, and it is stated that the method of wall support and construction causing seal leakage proved an objectionable feature, while the high first cost usually prohibited its use.



Plan and Cross Section at Left, with Longitudinal Section Above, Show Makeup of the New Slag Pocket. At right is shown the appearance after front wall has been pulled down

Various other designs of pockets, such as plates held with buckstays lined with 4½-in. walls, with inside walls and floor 4½ in. to 9 in. thick, supported from the outer walls and bottoms by a layer of sand, have been tried, but it is claimed with little success. Under these various plans the slag was cooled, but due to the methods employed it remained in a solid mass fused to the walls, and had to be dug out with sledges, bars and picks, or with a slag gun.

New Design to Overcome These Difficulties

To solve this problem, the Whalen patented removable air-cooled slag pocket, built by J. A. Gabriel & Co., Cleveland, is designed to allow the slag to expand and to contract in cooling, cracking it into chunks and making it flaky, thus avoiding difficulty in removal should the entire mass of material be too heavy to be pulled from the chamber with a crane. The pocket is built inside the ordinary slag pocket, the walls of the latter being shown in light lines in the drawing. The brickwork rests upon a plate sufficiently strong to carry the slag load, the whole being supported by beams. The bottom of the pocket is given a surface of sand to cover rivet heads and to facilitate the laying of the pocket floor.

Side and back walls are 4½ to 9 in. thick. The first three courses of the walls are made with every other matched brick at right angles. Alternate spaces of plain 4½-in. and staggered walls build the pocket up to the open air passage under the two top courses. The 9-in. walls project to within ½ in. of the stationary chamber walls. The two top courses are not cemented to the stationary wall, but the lower course is cemented to the pocket walls. Consequently air cannot enter into the pocket through this seal of two courses. The front wall is sealed tight to the stationary walls.

Inserted in the side wall are angles to facilitate the removal of the pocket, as these hold the brick away from the stationary walls and guide the pocket walls when being loosened up and down. The vent pipes are inserted in each side of the front wall. Slag pull-out hooks are laid in the floor. It is stated that the pocket can be built cheaply of brick and scrap material by any stone mason.

How the Pocket Is Removed

To take out the slag, part of the front below the front wall arch is removed and the top courses of uncemented brick are removed from the slag pocket. The crane hook is then attached to the front cross-beam and moved up and down, at the same time pulling out. When the pocket seems free the crane hooks are attached to the slag pull-out hooks and the pocket is drawn out. Removal of the slag pocket is facilitated by having the pocket taper to a smaller width at the back than at the front.

The principal feature of this pocket is that no heavy walls are used. The whole pocket is cooled by the circulation of the cool air that comes in under the floor and passes completely around and up the side and back walls to the air passageway under the top courses of brick, leaving by way of the vent pipes. In cooling the slag contracts enough to free the side walls and breaks up into large chunks, making the slag flaky around the sides, as shown in the photograph.

The slag from one 100-ton open-hearth furnace equipped with these pockets was removed by four laborers in less than 24 hours. The deposit measured 10 x 15 x 4 ft. in each pocket. One-half of the slag came out from one pocket in one solid chunk. The labor saving, as compared with ordinary practice in a stationary pocket, has been calculated at 24 man-days at $6.75, or $162 each time the slag pocket is cleaned.

The Westinghouse Airbrake Co., Wilmerding, Pa., has announced a reduction in wages, affecting all except salaried employees, effective April 1. A similar reduction in prices on finished products of the company is to accompany this change. The company had planned upon a complete shutdown, but at a meeting of the department heads late last week, it was decided to operate the plant at about 50 per cent capacity.

H. I. Gardner and E. W. Gardner, identified with the electrical department of the Lowellville, Ohio, plant of the Sharon Steel Hoop Co., Sharon, Pa., have organized the Mahoning Mining & Mfg. Co., which has been incorporated under Ohio laws with a capital of $250,000.

MEASURING FURNACE GAS*

New Device Giving Reliable Results—Comparison With Other Methods

BY D. L. WARD AND R. S. REED

This paper is the result of a study, in 1919, to determine how much surplus power could be produced through the proper utilization of the entire gas flow from the two furnace stacks at the Federal Furnace Plant, South Chicago, Ill. Obviously, the problem was to measure the flow of gas through the main beyond the point where the amount necessary for stove operation was removed. In all probability, blast furnace

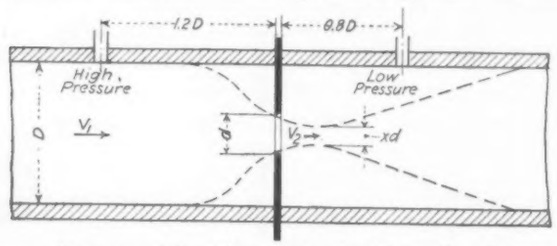


Diagram of the New Device for Measuring Gas from Blast Furnaces

gas is the most difficult gas to measure, because of the high moisture and dust content, and the widely fluctuating flow from the furnaces. This wide fluctuation of flow forbids the acceptance of any one group of flow readings as indicative of normal operating conditions.

A study of the conditions showed that a recording device on gas flow was necessary. As the gas at the point of measurement had passed through wet washers, and accordingly was saturated with water and contained considerable dust carried past the scrubbers in the form of sludge, no form of Pitot tube could be used, for this sludge would quickly plug the dynamic and static holes, spoiling the gage readings. An even more serious objection to the use of Pitot tubes was the impossibility of accurately measuring the cross-sectional area of the gas main on the plane of Pitot-tube installation. Given an absolutely clean gas and a perfectly circular pipe, it would be safe to assume, through measurements of the pipe diameter, that the gas main was of a certain cross-sectional area. But the continual depositing of sludge and the fact that the main was fabricated from riveted sheets led us to discard the idea of using Pitot tubes for this service.

The Venturi tube was then considered, and had there been a sufficiently long straight run of gas main to accommodate a tube of the required size (72 by 28 in.) such an installation would very likely have been made.

A plate with a sharp-edged orifice was eventually accepted as it possesses all the characteristics of a Venturi tube, requires less space, and is much easier and cheaper to install. Besides, sludge deposits do not tend to affect the diameter of a sharp-edged orifice as greatly as the throat of a Venturi tube, and it is reasonable to assume that sludge deposits are more easily removed. Accordingly a plate with a 43-in. (109 cm.) orifice was installed in the 72-in. (182.9 cm.) main in connection with an indicating-recording-integrating meter. This instrument has been in run over 10 months and has given no trouble to operate or maintain. A sensitive legible record is obtained from every fluctuation in gas flow.

When originally installed the instrument was designed to operate on a maximum differential pressure across the orifice of 3 in. (7.6 cm.) of water. At this differential the flow rate would be about 3,000,000 cu. ft. (84,950 cu.m.) per hr. Later, when two furnaces were put in operation, it was found that a greater amount of gas would be produced, so the float was arranged to operate under a maximum differential of 4½ in. (11.4 cm.) of water.

*From a paper presented at the February meeting in New York of the American Institute of Mining and Metallurgical Engineers. The authors are respectively general superintendent Federal Furnace Plant, By-Products Coke Corporation, Chicago, and with the Semet-Solvay Co., Ashland, Ky.

The flow of gas through a properly designed orifice takes the same form as through a Venturi tube, but, owing to the sudden change in cross-sectional area, the smallest section of gas occurs after having passed through the orifice. As shown in the illustration, the gas flow having an initial velocity of v_1 and a corresponding static pressure of p_1 is forced through an orifice and its velocity increased to v_2. This increase in velocity, which is maximum at the point of greatest contraction xd, produces a static pressure p_1 lower than p. In other words, a certain proportion of the initial pressure p is converted into velocity pressure due to the constriction introduced in the gas main.

The formula that has been developed is as simple and reliable as necessary for determining the flow of gas through an orifice. It is as applicable to Venturi or Pitot tubes if the proper value for c is substituted.

$$Q = CA\sqrt{2gH}$$

where Q = flow of gas, in cubic feet per second;
C = coefficient of flow;
A = area of orifice, Venturi throat, or pipe section of Pitot tube, in square feet;

$$H = \frac{T \times 225. \times h}{P \times D}$$

where T = absolute temperature of gas, in degrees C.;
h = differential pressure, in inches of water;
P = absolute pressure of gas, in millimeters of mercury;
D = specific gravity of gas referred to air.

[Expressing P in inches of mercury, instead of millimeters, the value of H becomes $\frac{T \times 9 \times h}{P \times D}$. EDITOR.]

For Venturi tubes C, the most important and variable value, has been generally accepted as 0.95 to 0.99; it usually varies directly as the ratio of the throat diameter to the upstream pipe diameter. For Pitot tubes, the value C varies anywhere from 0.5 to unity due to the many different types of Pitot tubes used and their relative location in the gas flow. In some cases traverses of the gas main are made in order to obtain an average velocity reading; in others, the tube is permanently located in a certain position and the value of C adjusted accordingly.

In order to test the accuracy of the gas-meter installation, it was decided to calculate the theoretical yield of gas from the furnace and run a short test by diverting the entire gas flow through the boiler-house gas main. To do this, it was necessary to shut off the gas flow to stove burners and then measure the increased gas flow through the orifice. The method employed for calculating the gas yield was that outlined by Richards.†

Let L = limestone charged per day, in lb.; C = coke charged per day, in lb.; F = flue dust collected per day, in lb.; P = pig iron produced per day, in lb.; A = carbon, by analysis, per cent; B = CO_2 by analysis, per cent.

The percentage of carbon is found in the flue-dust, coke, and pig-iron and the per cent CO_2 in limestone; in the latter case due account is made for the $MgCO_3$ content. The theoretical amount of carbon converted into gas may then be found thus:

Carbon converted to gas, lb =
$(0.27281\,LB + CA) - (FA + PA)$.

It is then necessary to analyze the furnace gas and calculate the amount of carbon in each cubic foot of gas; generally this value will be between 0.012 and 0.0155 lb. (0.0054 and 0.007 kg.) per cu. ft. If this value is divided into the figure obtained from the formula, the theoretical gas yield per day may be calculated. At the Federal plant these analyses and calculations were used with the production figures over 24-hr. periods; the resultant figures were very consistent, and, during tests made with the orifice meter, checked the gas-flow figures very closely. Sometimes the 24-hr. results were not in line with the flow-meter figures; at other times, the two methods checked within several thousand cubic feet of gas per 24 hr. However, when the figures were tabulated, averaged, and compared over one or two weeks' period of time, the results were very satisfactory. They show the value of blast furnace gas flow tests and records covering a considerable period of operation, and the comparative inaccuracy of gas flow tests of short duration.

†Metallurgical Calculations, Part II, Chapter III.

Mannesmann Oblique-Rolled Seamless Tubes*

Dependence Upon Obliquity of Rolls for Hollowing of Solid Ingots—Torsional Forcing of Material Away from Center —Relation Between Roll Taper and Hollowing Produced

IN 1886 the first patent for making tubes by the oblique rolling process was granted in Germany to Dr. F. Koegel in behalf of Mannesmann Brothers of Remscheid. Mills based on this principle were erected in several places in Germany, Bohemia and later in Wales, but in spite of strong financial support they did not produce the results desired. This was mainly because it was attempted to produce finished tubes and pipes in the one process from the solid ingot —an idea which later had to be discarded because the result could not be achieved commercially. The chief hindrance appeared to be the production of homogeneous material in which the finest molecular coherence of particles should exist. Cracked and piped material

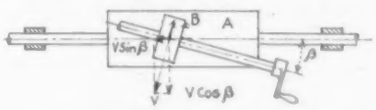


Fig. 1. Operation of an Oblique Roll

continues to cause trouble even in the improved apparatus to-day employed.

As a result of these early experiences the oblique rolling mills are now used only as roughing mills, and the bars rolled hollow upon them to a wall thickness of approximately 1 in. Ingots or billets are used of such weight that a tube of 25 to 40 ft. in length may be made from a single piece. To produce from these relatively thick-walled cylinders a finished tube with a wall thickness from 0.1 to 0.5 in. a finishing roll train, also an invention of Mannesmann Brothers, is used. This is the so-called "pilgrim-step" process, sometimes known as the Perrin process. The "face-plate" bevelled disk, oblique rolling mill, similar to claims in the first Mannesmann patent, has been further developed by R. C. Stiefel, a German-Swiss resident in the United States. Merely fundamentals of the oblique rolling process will be here discussed, based upon a paper by Professor Reuleaux in 1890.

Consider a piece of work *A*, Fig. 1, supported on bearings, and oblique to its axis the roll *B*, which can be rotated while pressed against the work. The latter is so held that it may both rotate and move longi-

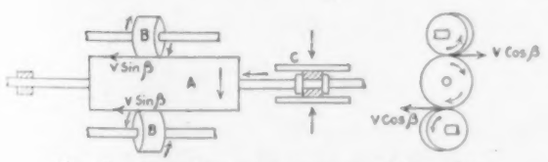


Fig. 2. Operation of a Pair of Oblique Rolls

tudinally. If the roll *B* is turned, its revolution is transmitted to the work *A*, but at the same time an endwise movement of *A* is produced. If v be the circumferential speed of the roll, the revolution of the work is $v \cos \beta$ and the speed of the longitudinal displacement $v \sin \beta$, where β is the angle at which the two axes cross. The force which causes the rotation and end travel of the work comes from the pressure between the roll and the work.

If now another roll is pressed against the other side of the work, whose axis likewise makes an angle β with that of the work, Fig. 2, we obtain through the opposed pressure of the two rolls a definite movement and rotation of the work. But if the work is so held in a bearing *C* that axial displacement is impossible, then at the point of contact of the roll with the work there is an attempt to drive the surface particles of metal in the longitudinal direction. Though this tendency can at first have hardly any other effect than to wear off the surface, it leads to the basic principle of oblique rolling.

In Fig. 3 is shown this process substantially as carried out in practice. The work *A* is held back by the taper on the rolls and its surface particles are urged forward by the rolls. This action affects not only the surface particles, but extends also to the interior of the work; the material is drawn out of the middle and pushed spirally forward toward the exterior.

It appears that the early assumption was incorrect which held that for proper hollowing it is necessary to oppose a mandrel to hold back the core of the material. This was originally supposed by the inventors and also by Professor Reuleaux. The hollow piece is produced even without using a mandrel. In rolling work the mandrel serves the purpose only of bringing the material to an equal wall thickness, and of smoothing the inside. It is chiefly useful in the final passage of the last part of the work through the rolls.

As already mentioned, this method requires homogeneous material. The individual fibers must be coherent so that they shall flow in response to the pull

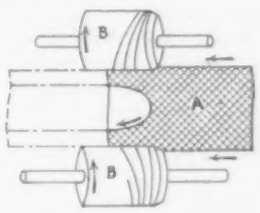


Fig. 3. Formation of a Hollow Ingot in Hollow Rolling

from the surface. This circumstance becomes the more notable the thinner the walls are to be that are hollow rolled. This structural quality of the material explains why the oblique-rolling process has been so well established for rolling copper tubes, and in that field has been so extensively used, even for rolling thin-walled tubes.

Theory of the Oblique-Rolling Process

In Fig. 4 are shown the rolls of ordinary design for the Mannesmann oblique rolling mill, whether for the smallest application or for hollow rolling of solid bars 3 to 6 in. or more in diameter. With a body length of 20 in., the maximum diameter *D* of the roll is 14¼ in. Besides this size, roll trains are constructed with $D = 17\frac{3}{4}$ in. and $D = 21\frac{5}{8}$ to $25\frac{5}{8}$ in.

At the right side of the maximum roll diameter *D* (Figs. 4 and 5) is the working cone, with a length *L* and an inclination of its sides equal to the angle α. This working cone is of greatest importance in the hollow rolling and the theoretical consideration of the rolling process is especially concerned with it. The angle of inclination is taken such that $\tan \alpha = \frac{1}{8}$ to 1/18.

A point of particular importance is the obliquity of the rolls. Each of the two equal rolls lies at an angle β to the horizontal, of about 5 deg. The center lines are therefore, as projected on the vertical plane, inclined to each other by an angle 2β of about 10 deg. and intersect at the middle of the rolls. This projected point of intersection of the roll center lines on the vertical plane is called the central point *M* of the Mannesmann rolling mill. All measurements of length and breadth proceed from *M*, and vertical dimensions

*Abstract of Doctoral Thesis of Dr. Karl Gruber at Technical High School, Breslau, Germany; published in full in *Stahl und Eisen*, Sept. 4, 1919, *et seq.*

are referred to the horizontal plane of the central point as the principal plane of the roll train. The obliquity of the rolls affords an automatic feed of the ingot between the rolls.

Now the rolling of the ingot takes place, not in the principal plane of the roll train but above it, as shown in Fig. 6, by a distance H (about 1 9/16 in. for small roll trains). The ingot would therefore be forced out above, in rolling, if not prevented by the top roll shown in Fig. 4. The latter has thereby to take up a part of the rolling pressure and forms, for hollow rolling, the upper closure of the pass. For normal hollow rolling the lower guide is not necessary, but it is nevertheless retained for extraordinary cases.

No special rolling advantage comes from rolling

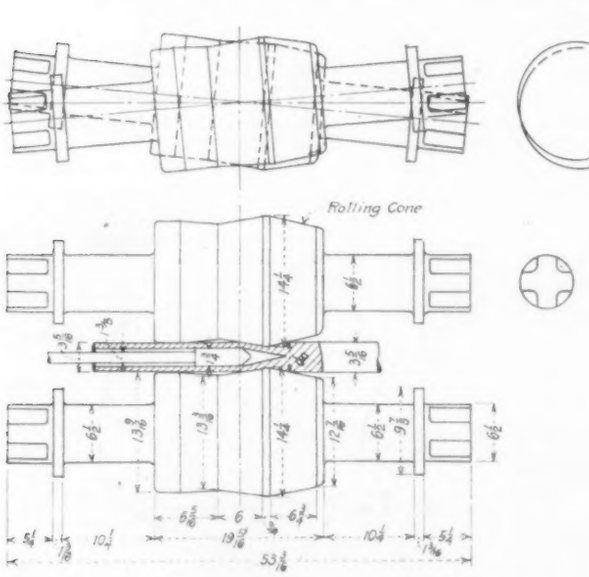


Fig. 4. Rolls Ordinarily Used for a Mannesmann Oblique Rolling Mill Handling Solid Ingots from 3 to 6⅛ in. in Diameter. Dimensions in inches

above the principal plane, but rather the roll must be inclined with the low-lying end toward the ingot so that the center lines of the rolls assume a position completely askew to each other. But through placing the ingot higher, and with it the mandrel, the mandrel bar and the counter-bearing, a stronger construction of the roll bearings is permitted.

Both main rolls turn in the same direction and with the same rotary speed. Looking in the direction of feed, the ingot must then turn so that its upper

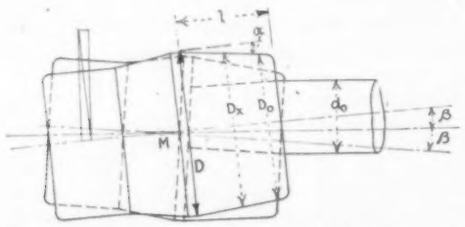


Fig. 5. Angular and Diametral Measurements of Rolls and Ingot, with Middle Point at M

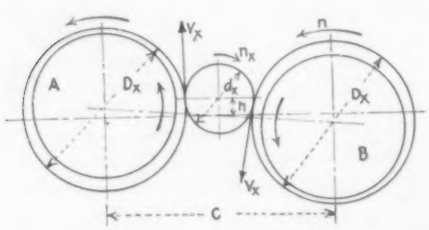


Fig. 6. Oblique Rolls and Ingot, Viewed from the Entering End

part travels from the high to the low end of the rolls. Thus it is automatically drawn in between the rolls. The top roll runs free as a friction roll with the same circumferential velocity as the main rolls.

A cross section at any point of the working cone with a diameter equal to D_x gives a tangential circumference velocity at N r.p.m. of $v_x = D_x \times \pi \times \frac{N}{60}$. In the same cross section the ingot diameter is d_x and the r.p.m. of the ingot is n_x. The ingot diameter steadily decreases in the working cone from d_0 to d_1 while the corresponding roll diameters regularly increase from D_0 to D_1. The consequence is that the r.p.m. of the ingot rapidly increase from n_0 to n_1.

The variable quantity n_x may now be computed by the equation (see Fig. 7): $d_x \cdot \pi \cdot \frac{n_x}{60} = v_x \cdot \cos\beta$

whence $n_x = \frac{60 \cdot v_x \cdot \cos\beta}{d_x \cdot \pi}$ or also $n_x = \frac{D_x}{d_x} \cdot \cos\beta \cdot N$ (1)

Assuming the feed of the ingot equal to that of the horizontal speed-component $v \cdot \sin\beta$ at the roll circumference, the feed at each revolution (see Figs. 7 and 8) is:

$$S_x = \frac{v_x \cdot \sin\beta}{n_x} \cdot 60 = \frac{v_x \cdot \sin\beta}{v_x \cdot \cos\beta} \cdot d_x \cdot \pi$$

whence $$S_x = d_x \cdot \pi \cdot \tan\beta \qquad (2)$$

This feed for each revolution is equivalent to the pitch of the helical line on the conical ingot surface. If the roll train is designed for a certain angle β, then the pitch S_x, proportional to the diameter, is as follows:

for $\beta = 4$ deg., or $\tan\beta = 0.07$ . . . . . $S_x = 0.22\ d_x$
for $\beta = 5$ deg., or $\tan\beta = 0.0875$ . . . . $S_x = 0.275\ d_x$

The movement of the ingot therefore is just as if it

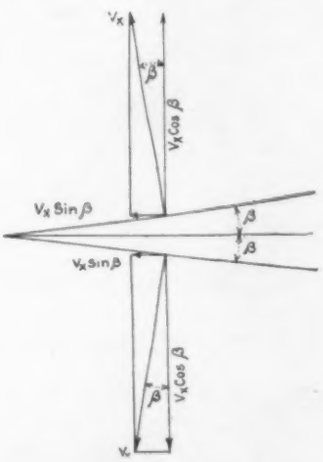


Fig. 7. Velocity Diagram

were screwed in between the rolls with a taper thread, and at the same time the thread were constantly forming anew. But as soon as the feed of the ingot is opposed by the resistance of the mandrel, the r.p.m. become constant and the pitch becomes less. The helical lines run flatter, especially when the end of the ingot has arrived between the rolls, which makes it more difficult to form the interior hollow space.

It must here be mentioned that because of the elevated position of the ingot center line above the principal middle plane, small differences in the movement relations occur, but these may be assumed practically negligible. Thus in a single circular cross-section of the ingot, the circumferential velocity on one side is slightly less than on the other side. The top roll here equalizes matters, as a sliding action takes place with an intermediate velocity.

Torsion Angle for Cylindrical Ingots in the Cone

As soon as the solid round ingot is gripped by the rolls its rotative speed becomes

$$n_0 = \frac{D_0}{d_0} \cdot \cos\beta \cdot N$$

The r.p.m. now increase progressively until, for the smallest diameter d_1 and the greatest roll diameter D, the figure reaches

$$n_1 = \frac{D}{d_1} \cdot \cos\beta \cdot N$$

As the revolutions per second regularly increase from

$$\frac{n_0}{60} \text{ to } \frac{n_1}{60},$$

the cross-section diminishes at a rate per second corresponding in rotations to

$$\frac{n_1 - n_0}{60}$$

This decrease may be expressed in degrees and we get the angle:

$$\frac{n_1 - n_0}{60} \cdot 360 = 6\,(n_1 - n_0)$$

The feed of the ingot from entrance to the point of

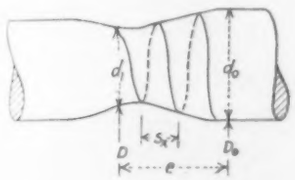


Fig. 8. Advance of the Ingot Between the Rolls

smallest cross-section corresponds to a time t seconds, and gives a fully definite value of this angle equal to

$$\phi = 6t(n_1 - n_0) \qquad (3)$$

So long as the time t for the change from d_0 to d_1 remains constant, this angle of torsion ϕ will likewise be constant.

The magnitude of the angle of torsion can be assumed as the measure for the formation of the interior hollow, so that a given angle ϕ will correspond with a definite relation of the inside diameter to the smallest cone diameter α. It is therefore necessary to determine accurately the value ϕ from the roll and ingot dimensions and the angles of obliquity α and β. For this purpose it is first necessary to determine the time t. The length l of the ingot cone (Fig. 9) equals:

$$l = \frac{D - D_0}{2\tan\alpha} = \frac{d_0 - d_1}{2\tan\alpha} \qquad (4)$$

The axial speed of the ingot, that is the feed per second, is at any chosen point:

$$c = v_x \cdot \sin\beta = D_x \cdot \pi \cdot \frac{N}{60} \cdot \sin\beta$$

The increase of the speed c takes place within the limits:

$$c_0 = D_0 \cdot \pi \cdot \frac{N}{60} \cdot \sin\beta \text{ and } c_1 = D \cdot \pi \cdot \frac{N}{60} \cdot \sin\beta$$

The average value is therefore:

$$c = \frac{c_0 + c_1}{2} = \frac{D + D_0}{2} \cdot \pi \cdot \frac{N}{60} \cdot \sin\beta \qquad (5)$$

The time t is now obtained by division of Equation (4) by (5):

$$t = \frac{l}{c} = \frac{d_0 - d_1}{D + D_0} \cdot \frac{1}{\pi \cdot \frac{N}{60} \cdot \sin\beta \cdot \tan\alpha} \qquad (6)$$

From the above equations for n_0 and n_1 we may write:

$$\frac{n_1 - n_0}{60} = \left(\frac{D}{d_1} - \frac{D_0}{d_0}\right) \cdot \frac{N}{60} \cdot \cos\beta \qquad (7)$$

By substituting the values (6) and (7) in Equation (3) we now get the value of the angle of torsion:

$$\phi = \left(\frac{D}{d_1} - \frac{D_0}{d_0}\right)\left(\frac{d_0 - d_1}{D + D_0}\right) \cdot \frac{360}{\pi \cdot \tan\beta \cdot \tan\alpha}$$

or also

$$\phi = \frac{D\left(\frac{d_0 - d_1}{d_1}\right) - D_0\left(\frac{d_0 - d_1}{d_0}\right)}{D + D_0} \cdot \frac{360}{\pi \cdot \tan\beta \cdot \tan\alpha} \qquad (8)$$

In this equation for ϕ is expressed the influence that all quantities severally can exert upon the angle of torsion, and with it upon the hollowing effect. The second factor, containing the angles α and β, is constant for a given roll train; for $\beta = 5$ deg. and $\tan\alpha = \frac{1}{15}$, it becomes 19,640.

For the Mannesmann rolling mill with diameter of rolls 14¼ in., β is generally 5 deg. On the other hand α varies greatly and for $\alpha = 4$ deg. we get:

$$\frac{360}{\pi \cdot \tan\beta \cdot \tan\alpha} = \frac{360}{3.14 \cdot 0.0875 \cdot 0.07} = \frac{360}{0.01925}$$

For $\alpha = 7$ deg., $\frac{360}{3.14 \cdot 0.0875 \cdot 0.1228} = \frac{360}{0.03377}$

With these two values of α, the angle of torsion will therefore be quite different. Suppose we write

$$\frac{D\left(\frac{d_0 - d_1}{d_1}\right) - D_0\left(\frac{d_0 - d_1}{d_0}\right)}{D + D_0} = E$$

$D = 14¼$ in. $D - D_0 = d_0 - d_1$, from which D_0 is determined, and $d_0 = 3$ or 6 in. ingot diameter.

Mannesmann Oblique Roll Process

From Table I it appears that where the roll is set with increasing obliquity the value E, and with it the angle of torsion, very sharply rises. If by reason of

Table I. Roll setting and angle of torsion.

$\frac{d_0 - d_1}{d_0}$	0.05	0.075	0.10	0.125	0.15
$d_0 - d_1$	0.15 in.	0.225 in.	0.3 in.	0.375 in.	0.45 in.
d_0	3.0 in.	3.0 in.	3.0 in.	3.0 in.	3.0 in.
E	0.001587	0.00366	0.00668	0.01071	0.01585
$d_0 - d_1$	0.3 in.	0.45 in.	0.6 in.	0.75 in.	0.9 in.
d_0	6.0 in.	6.0 in.	6.0 in.	6.0 in.	6.0 in.
E	0.001862	0.004293	0.007824	0.01255	0.01856

the setting $d_0 = d_1$ is increased threefold, the value E is raised tenfold. Thus we can say that the angle of torsion, and with it the hollowing, increases approximately as the square of the diminution of ingot diameter produced by the roll setting.

At this point some suggestions may be made for regulating the hollowing process. The rolls should be so arranged that a hollow forms of sufficient size to allow the hollow ingot to be thrust easily over the mandrel, and that the inner surface be smooth enough for the purpose.

If the mandrel meets too great resistance the rolls must be brought closer together in order to increase the diameter of the hollow.

The development of Equation 8 is based upon the assumption that the ingot passes between the rolls unhindered. When, however, that is not the case, but

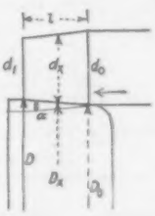


Fig. 9. Cylindrical Ingot Tapered by the Rolling Cone

the mandrel offers a considerable resistance, the speed may easily be only half as great and the time twice as long as if the passage were free. The value ϕ for the angle of torsion should not be changed thereby. We must otherwise arrange to reduce this angle by half.

This departure from free passage is especially noticeable when the end of the ingot has reached the rolls. It can at that point no longer form a hollow and the mandrel resistance reaches a considerable maximum value.

Herein lies the troublesome point of hollow rolling, which results in a very great excess consumption of power at the end of the pass, concerning which more will be said later.

(To be continued)

DESULPHURIZING COKE*

Passing Hydrogen Through the Ovens—Organic and Mineral Sulphur Lowered

The decreasing supply of low-sulphur coals for the manufacture of metallurgical coke has emphasized the need of some process for the production of low-sulphur coal. Washing as a means of decreasing the sulphur in the original coal has been mentioned. We shall now consider methods for the removal of sulphur from the coke itself.

The sulphur in coke is very stable and very hard to remove without destroying the coke itself; and the fact that we are dealing with material in solid chunks makes the problem of sulphur removal very difficult. Schemes have been proposed and patents taken out for processes making use of steam, air, chlorine and carbon monoxide passed through the hot coke, and processes in which salt, sodium carbonate and manganese dioxide have been added to the coke. All of these have proved inefficient as desulphurizing methods or have destroyed the coke.

The fact that hydrogen will decrease the sulphur in coke without otherwise affecting it has led the United States Bureau of Mines to investigate such a process. The laboratory data on this are given below. Tests on coke ovens have been conducted under our observation in which the purified coke oven gas was passed back through the oven. Very encouraging results have been obtained, but the investigation is still largely in a state of evolution.

Table on Desulphurization by Hydrogen in Coking Test of Joliet Coal

	Without Hydrogen	With Hydrogen
Total sulphur in coal, per cent, air dry coal.	0.82	0.82
Sulphur as hydrogen sulphide, per cent, air dry coal	0.25	0.59
Total sulphur in coke, per cent, air dry coal.	0.55	0.21
Total sulphur in coke, per cent, air dry coke.	0.75	0.29

The effect of passing hydrogen through in excess while the coke was at 1000 deg. C. is clearly apparent from this table. A considerable part of the sulphur of the coke has been converted to hydrogen sulphide and carried out of the coking chamber as such. The coke made from this coal in a by-product coke oven contains only 0.64 per cent sulphur, while the coke made in the laboratory has 0.75 per cent. This difference is probably due to the diffusion of the coke oven gas through the oven and the consequent elimination of more sulphur than would result from the primary reactions alone. The comparative effect of pure hydrogen and a coke oven gas containing 50 per cent hydrogen, when allowed to act for a long time on coke from an Upper Freeport coal, is that coke-oven gas has the same effect as hydrogen, but to a lesser extent.

*Table of Relation of the Sulphur Forms of the Coal to Sulphur in the Coke**

Coal	Organic Sulphur, Per Cent of Total S.	Inorganic Sulphur, Per Cent of Total S.	Sulphur in Coal, Per Cent	Sulphur in Coke, Per Cent	Sulphur in Coke, Per Cent, By-product Oven
Pocahontas	85.5	14.5	0.55	0.45	....
Washed Vandalia	78.2	21.8	1.15	1.14	....
Joliet coking.....	68.3	31.7	0.82	0.75	0.64
Upper Freeport..	58.8	41.2	1.14	1.09	....
Tennessee	50.6	49.4	3.54	3.22	....
Raw Vandalia...	48.1	51.9	1.35	1.30	....
Pittsburgh	47.0	53.0	1.49	1.51	....

*Data based on sulphate-free coal, containing only organic and pyritic sulphur forms.

Observations of a number of coke oven tests have led to the conclusion that the sulphur of the coal divides quite uniformly between the coke and the volatile matter. Even with washed coals where the proportion of organic sulphur is high this ratio seems to hold good. This would seem to indicate that the forms of sulphur in the coal do not determine how much sulphur would be left in the coke. The accompanying table bears out this point.

This table has been arranged in order, the coals with the highest percentage of organic sulphur coming first. A study of this reveals no connection between the forms of sulphur in the coal and the proportion retained in the coke. Some observers have advanced the theory that organic sulphur would be eliminated in the coking process, but this is certainly not true. Comparing the washed Vandalia (a high organic sulphur coal) with the raw Vandalia (a high pyritic coal) the sulphur has been reduced about the same in both during the coking process.

To sum up the action of the sulphur of coal when the coal is coked, it may be stated that pyrite gives half of its sulphur to the gas and the other half remains in the coke. Likewise, the organic sulphur divides almost half and half. The sulphur of the finished coke is mostly an unknown carbon-sulphur combination, with a smaller quantity of metallic sulphide.

At the present time the following conditions seem to be most essential for this desulphurization process. The temperature must be as high as possible, a large volume of hydrogen or hydrogen-containing gas must circulate through the oven at a fairly fast rate, and this must then be purified, preferably by a hot process, and then re-circulated.

It has been said by a blast furnace superintendent that desulphurization of a metallurgical coke, analyzing over 1 per cent of sulphur, so that the sulphur would be reduced 25 per cent, would be worth $1 per ton. From an economic standpoint the problem of sulphur reduction is, therefore, well worth considering.

*From a paper, "Sulphur in Coal and Coke," published in the Proceedings of the Engineers' Society of Western Pennsylvania, December, 1920, by permission of the Director, U. S. Bureau of Mines. The author, Alfred R. Powell, is physical organic chemist, Pittsburgh Experiment Station, U. S. Bureau of Mines.

Employment in New York State Factories

In its monthly survey for January the bureau of statistics of the New York State Industrial Commission reports a decrease from January, 1920, of 24.7 per cent in the number of employees engaged in manufacturing establishments. This is accompanied by a decrease of 21.6 per cent in total wages paid, indicating that the average worker this January received 4.1 per cent more money than the average a year ago. Comparing January, 1921, with December, 1920, the drop in number of employees was 7.6 per cent and in total wages paid 10 per cent, indicating a decrease of 2.6 per cent in the average wage. January, 1921, found 7 per cent fewer workers employed than June, 1914, but total wages paid were 103 per cent greater, indicating an advance per man averaging 117 per cent, while retail food prices were up only 74 per cent.

In the division of industry classed as "Metals, Machinery and Conveyances," the decrease during the year in both number of employees and total wages was about the same as for the general list, but the drop from December was somewhat heavier. Index figures, based on June, 1914, as 100, are given in the table, showing that the average wage a year ago was keeping just about on a par with the rise in food prices. Since that time, however, food has lost 28.2 per cent of its rise, while wages have advanced by 4.1 per cent in the general list and 7 per cent in the metals group.

	June, 1914	Jan., 1920	Dec. 1920	Jan., 1921
All Industries				
Number of employees.....	100	124	101	93
Total wages paid.....	100	259	225	203
Average wage	100	209	223	217
Retail food prices.....	100	203	180	174
Metal Working				
Number of employees.....	100	157	131	118
Total wages paid.....	100	316	289	253
Average wage	100	201	221	214

The Niles Forge & Mfg. Co., Niles, Ohio, has been awarded the contract to furnish and fabricate 350 tons of structural steel for the new Rayen High School at Youngstown.

Foundry Pig Iron in Birmingham District

Trend Towards Use of Machine Cast Pig by Foundries — Advantages Over Sand Cast Iron Include Lower Melting Point

BY Y. A. DYER

A REVIEW of the trend of pig iron manufacture in the Birmingham district over a period of 18 years is particularly interesting from the standpoint of modern methods which have been adopted to keep the district abreast the times in the manufacture of foundry iron. The first striking innovation was the change from 150 and 200-ton stacks to 350 and 500-ton stacks, and the installation of skiphoists to adequately fill these monster producers. Then came the retort coke oven to replace the old beehive oven. These two factors have produced important economies in operation and have materially increased output, with consequent solving of labor problems in their respective spheres.

However, with respect to manual labor and heavy cost charges, the wonder has been that the real drudgery of furnace labor, in handling the iron from the cast shed to yard and into railroad cars, has not been more readily relieved. Probably this question may be partially solved in the statement of facts which is to follow. In the interim of the advance made by the furnace companies in erecting larger stacks and reducing costs, the foundrymen of the country were also progressing along lines metallurgical and became quite as vitally interested in securing pig iron of known constituent quality as they were to be satisfied that a large tonnage or iron was being made available for them by reason of these innovations. Therefore, as early as 1906 foundrymen became quite insistent in their demand on southern producers for iron by analysis instead of fracture grading. This demand increased with momentum each year thereafter, until to-day fracture grading has practically given way to analysis specification; and the district has met this demand.

In some instances it has entailed a readjustment of furnace burdening, furnace practice and operations in general to keep pace with the foundryman's demands for a chemically and physically high-grade pig iron for foundry purposes. This lapse of fracture grading practice has naturally removed any existing prejudice against a close-grained iron, provided it is well balanced in its constituent elements; and with its departure has come the further demand on furnace companies for a cleaner, more uniform and small size pig. This forward trend has ushered in for the Birmingham district the most recent innovation in foundry iron production, and has thus solved the troublesome and expensive hand-labor handling of pig iron from cast shed to cars. The Alabama Co. has installed, and now has in operation at its Gadsden plant, a Heyl & Patterson pig casting machine of the latest design, thus anticipating the wants of the foundrymen for a cleaner and smaller size pig, averaging 38 to 40 lb.

The Molten Pig Iron Flows from the Ladle into the Casting Machine. The insert shows the loading of the pigs into cars direct from the machine

Old-Time Grading by Fracture

The change from sand cast pig to machine cast iron accentuates the fact that the practice of attempt-

ing to judge the quality of pig iron by its fracture, or depend on such grading for uniform success in the manufacture of quality castings, is now practically obsolete. At every angle of cupola practice and foundry operation it is now fully recognized that the uncertainty of judging and using pig iron by fracture grading will likely reflect its ill effects down the entire line of foundry production. The general recognition of this fact has been the basis of past and present arguments advanced by the foundrymen to convince the furnace operators that their claims for the privilege of purchasing iron by analysis should be met. The modern foundryman, therefore, has come to appreciate and recognize the merits of a clean pig iron which is offered for sale to him on a uniform analysis guarantee. Whether the iron is open or close grained, by

The Metal from the Blast Furnace Flows into a Ladle Which Effects Thorough Agitation and Mixing. The ladle operates on trunnions so that the metal flows directly to the casting machine by simply tilting the ladle

reason of the arrangement of the constituents of its carbon, is of no great moment to him, that is, whether the iron contains a small percentage of graphitic carbon by reason of slow cooling in sand or a large one of combined carbon by reason of quicker cooling in machine molds. He is, however, vitally interested in knowing the percentages of total carbon, silicon, sulphur, phosphorus and manganese present in the iron.

With this knowledge before him he knows that the constituency of the carbon element in the pig iron may be ultimately adjusted on remelt by the employment of proper methods in preparing cupola mixture, pouring temperature of the metal and rate at which it is permitted to cool. He further understands that if given a pig iron showing close fracture by reason of its carbon constituency, say 0.90 to 1 per cent combined carbon and 2.55 to 2.45 per cent graphitic carbon (total carbon 3.45 per cent), the problem then assumes the mere nature of "cupola efficiency and foundry metallurgy" to determine final graphitization in cupola metal, provided other elements present in the iron are correctly proportioned to balance the mixture.

To illustrate the point in question the writer submits a test made by him recently, wherein a very low silicon machine cast pig iron (exceedingly close grained) was used in a mix ratio of 1 to 1 with a 2.47 per cent silicon sand-cast iron. The following results were obtained:

Mix	Si	S	P	Mn	G C	C C	T C
50 per cent sand pig	2.47	0.025	0.63	1.23	3.20	0.55	3.75
50 per cent machine	0.96	0.045	0.07	0.75	2.75	0.95	3.65
Casting analysis..	1.52	0.065	0.362	0.84	2.85	0.65	3.50

The metal was used to produce intermediate cylinders for triple expansion marine engines, weighing 8000 lb. each. The physical characteristics of the metal were homogeneity, freedom from segregation and easily machined.

To illustrate further the point under discussion, reference is here made to tests by A. Ladd Colby in determining the chemical comparison of sand cast pig iron with machine cast pig iron, samples having been taken from same furnace cast:

	Si	S	P	Mn	G C	C C	T C
Sand cast	3.00	0.040	0.770	0.95	3.21	0.25	3.46
Machine cast	2.99	0.041	0.773	0.95	2.46	0.92	3.38

Test ingots were made from these irons on remelt in cupola and analyzed for carbon in order to show the ultimate rearrangement of combined and graphitic carbon. The results were as follows:

	Graphitic Carbon	Combined Carbon	Total Carbon
Remelt sand pig.....	3.022	0.368	3.390
Remelt machine pig	3.100	0.257	3.357

It will be noted that while combined carbon in machine cast furnace pig iron is 0.92 per cent, on a remelt it is even lower (0.257 per cent) than that shown by the sand cast pig iron (0.368 per cent) on remelting.

Use of Steel Scrap

The general use of steel scrap in large percentages is another apt illustration of the point. The total carbon in steel is wholly in the combined state, therefore the metal is exceedingly close grained. Below are given the chemical results obtained by the writer in the use of 40 per cent Tropenas steel scrap and 60 per cent pig iron:

Mix	Si	S	P	Mn	G C	C C	T C
40 per cent steel..	0.35	0.05	0.058	0.86	....	0.35	0.35
60 per cent pig iron	2.15	0.016	0.56	1.43	3.20	0.51	3.71
Casting analysis..	1.37	0.038	0.379	1.06	2.50	0.70	3.20

This metal was used in the manufacture of sludge pumps. It was close grained, tough, strong and machined easily. There was no semblance of hard spots.

Consider the erstwhile suspicious old carwheel (close grained) as remelt scrap. The tread of a wheel (chilled and white) may contain 3 to 3.25 per cent combined carbon and only a negligible percentage of graphitic carbon. The hub, or gray portion, usually contains approximately 0.80 per cent combined carbon and approximately 2.75 per cent graphitic carbon. Both sections of the wheel contain low silicon, high sulphur, low phosphorus and medium manganese. It is not now due to the physical viewpoint, or fracture appearance of the metal, that the carwheel is looked upon with more or less disfavor as a scrap metal by gray iron foundrymen, for the carwheel manufacturer has steadily utilized 70 to 80 per cent of old wheels in mixtures. It is rather from the chemical viewpoint that the use of such metal is objectionable. The average gray iron foundryman knows that he cannot use a large percentage of old wheels in gray iron mixtures from the fact that the silicon is too low and sulphur too high, unless he prefers to use low priced scrap and

incur some extra expense to resiliconize the mixture by using high silicon iron or ferrosilicon, and desulphurize by using ferromanganese.

Advantages of Machine Cast Pig

The special advantages of a machine cast pig iron may be summed up by stating the following contributing factors:

More homogeneous product and minimum segregation.
More uniform distribution of elements, hence more uniform chemical analysis.
Lower melting point, thereby effecting saving in fuel and flux, and minimizing slag volume.
Saving in purchase price of iron received.

That segregation exists in molten cast iron appears from various experiments. Wust reports that he sampled and analyzed, at intervals of approximately one minute each, eight specimens taken from 6500 lb. of molten metal as it was being cast. The greatest deviations in results were: silicon 0.13, sulphur 0.01, phosphorus 0.15 and manganese 0.08 per cent. This test particularly demonstrates the danger of phosphorus segregation and the varying of silicon content.

By using the duplex system of agitating machine cast iron before it is poured—metal being tapped from furnace into casting ladle, then poured into molds—there is more reason to expect a thorough mixing of the elements than in casting in sand molds.

As to the second factor, it is a notable fact that the quicker iron solidifies after having been thoroughly mixed, the more uniform will be its chemical analysis. This condition is to be expected from the fact that the elements do not have time to segregate throughout the metal or selectively seek the outer edges or inner sections. Therefore, such uniform distribution of the elements in the pig iron would be expected to reflect uniformity of distribution in remelt iron.

As to the third factor, since the combined carbon will be higher in the machine cast pig iron than in sand cast pig iron it follows, without rational questioning, that the melting point will be lower. Roughly, the melting point will be 50 to 75 deg. Fahr. lower for a 0.90 to 1 per cent combined carbon iron as compared with an iron of 0.15 to 0.25 per cent combined carbon. White iron, practically free from graphite, melts at approximately 2050 deg. Fahr., whereas an iron high in graphitic carbon (3.40 to 3.50 per cent) melts at approximately 2280 deg. Fahr. Therefore, the melting point of iron will be lowered in proportion to the lowering of graphitic carbon, or increase of combined carbon. This condition, therefore, requires less coke to melt the iron, less heat to expel carbon dioxide gas from limestone—by reason of less stone used to flux coke ash and, on an average, approximately 50 lb. of sand per ton of pig iron melted. And lastly, less heat is required to melt slag, the volume of which will be reduced by using less coke and limestone and no sand, except that gathered in the cupola from other sources than the pig iron.

As to the fourth factor, there will be the following gain in weight realized in melting 100 tons of clean pig iron purchased by the gross ton and sold by the net ton:

Iron, Tons	Melting Loss, Per Cent	Lost by Melt, Tons	Iron Gained, Tons	Castings Made, Tons
100	0.3	0.3	11.7	111.7
100	0.4	0.4	11.6	111.6
100	0.5	0.5	11.5	111.5
100	0.6	0.6	11.4	111.4

In melting 100 tons of sand cast pig iron the losses and gains will be as follows:

Iron, Tons	Melting Loss, Per Cent	Lost by Melt, Tons	Iron Gained, Tons	Castings Made, Tons
100	3.00	3.00	9	109
100	4.00	4.00	8	108
100	5.00	5.00	7	107
100	6.00	6.00	6	106

These figures represent the probable maximum and minimum losses from all sources in melting each class of iron. If these figures should be exceeded it would indicate that there is serious cause for oxidation of the metal, due to cupola conditions. In comparing these loss and gain figures, it will be noted that the minimum deviation is 2.7 tons per 100 tons in favor of machine cast pig; maximum deviation is 5.4 tons in favor of machine cast pig, or an average of 4 tons. At the present price of pig iron this is a saving of $100 per 100 tons, or $1 per ton f.o.b. cars at the furnace.

Product of Mesabi Iron Co. Placed on the Market

Clement K. Quinn & Co., Duluth and Cleveland, have been appointed exclusive agents for the sale of the product of the Mesabi Iron Co., which is to be known in the trade as "Mesabi sinter." The Mesabi Iron Co., whose operations have been frequently referred to in THE IRON AGE, controls about 15 square miles of territory in the so-called Eastern Mesabi range and its product is the result of beneficiation of lean ores by magnetic separation. The price of the ore will be figured on a basis of Old Range Bessemer, giving full value to all iron units.

The booklet of Clement K. Quinn & Co. for 1921 gives the analysis of "Mesabi sinter" as:

	Per Cent
Iron	64.00
Phosphorus	0.027
Silica	9.00
Manganese	0.20
Alumina	0.67
Lime	0.10
Magnesia	0.50
Sulphur	0.005
Titanium oxide	0.03
Gain by ignition	1.83
Moisture	None

The guarantee for 1921 is iron 64.00, phosphorous .027.

Very desirable physical characteristics are claimed for the sinter.

Clement K. Quinn & Co. have taken an option on the Atikokan iron property in Ontario about 130 miles west of Port Arthur. The property consists of several mining locations on which a large tonnage of high-grade magnetite has been developed by previous exploration work and about 100,000 tons of ore has been mined and shipped. The decision as to exercising the option will depend upon the result of further investigations.

Gradual Recovery Expected

DETROIT, April 2.—Left over from last year is about $8,000,000 worth of industrial construction in Detroit. How much of this will be done is an open question. Nobody who has studied the industrial situation in Detroit can ignore the fact that facilities created in many lines during and immediately after the war are more than adequate for any present or potential demand for some time to come. Thus it seems extremely doubtful whether a large part of this work will be done, unless many plants add floor space without any certainty that it will be needed. The year 1919 was a boom year, judged by the 10 year average, and 1920 started out to be even better, but the collapse in the last few months brought it below the 1919 mark. Many builders now look forward only to a gradual recovery in industrial building, covering a period of perhaps five years, although, of course, considerable building in this line is done in Detroit during even years of greatest depression.

C. F. Adamson, general manager of the Adamson Manufacturing Co., East Palestine, Ohio, states that orders for electrically welded tanks manufactured by the interest, are being received daily and that additions are being made to the working force.

The Briggs Co., Lansing, Mich., has begun the work of erecting a new warehouse on land leased from the New York Central Railroad. The new building will be used for storage of steel bars, reinforcing steel and other stock.

Investigating Iron and Steel Freight Rates

Hearing at Memphis May Have Important Effect on Railroad Situation—Relation of Wages to Operating Expenses Being Carefully Considered

WASHINGTON, April 5.
THE IRON AGE BUREAU,
816 Fifteenth Street.

THE iron and steel industry, as well as business and agricultural interests generally, is showing much interest in efforts of President Harding to arrive at a solution of the railroad problem. Its seriousness is thoroughly appreciated here. This is indicated by the fact that in some circles the view is entertained that unless an immediate improvement develops, some railroads actually will go into the hands of receivers by July 1, amounting to Government control temporarily at least. Until the carriers do get on a paying basis, it is recognized that they will not come into the market for any substantial requirements and when it is recognized that they take practically 30 per cent of the iron and steel output, the importance of this fact is self-evident. Furthermore, they will not be able to pay for all purchases already made, for sufficient relief to this end is not expected from payment of Government obligations arising from Federal control and the guaranty period. These payments will mean a certain amount of necessary new purchases, but they will be limited.

The solution to be arrived at remains undetermined. The President held his first conference on the subject last Thursday with Chairman E. E. Clark of the Interstate Commerce Commission and Chairman R. M. Barton of the Railroad Labor Board. Information and opinions regarding the exact railroad situation and suggested remedies were sought. Details of the conference were not made public, but it is understood that figures showing the deficits at which the railroads are operating, together with petitions of shippers of all classes for lower rates, were gone over carefully. There can be no doubt that there is a general feeling that transportation rates have become so high that a lower scale is necessary if the volume of traffic is to increase normally. It is, of course, a question as to how lower rates might be established on a compensatory basis. The uppermost thought in this connection plainly is that wages must be reduced and this is acknowledged to be a problem calling for careful consideration which, it is believed, will be given at further conferences. That the American Federation of Labor is alive to the situation goes without saying. Appeal has been made by the department of railroad employees of the federation for a joint meeting with railroad managers at a White House conference.

Wage Situation

Until the wage situation is worked out, there is no expectation of a general decrease in freight rates, for operating returns, it is held, will not prove satisfactory while labor costs remain so high. It is also true that the railroads are looking for lower prices on materials they buy. There are many who think a general decrease in rates would increase the volume of traffic to such an extent that it would develop paying returns. Chairman Clark, however, said in an address in New York last Thursday night, a few hours after talking with President Harding, that "until the foundation has been laid for widening the margin between revenue and the cost of operating it is difficult to find justification for an attempt at a general reduction in rates."

The fact remains, however, that the present high rates not only are one of the contributing causes in restricting freight traffic, but also that they limit the movement of freight being transported. In other words, in times of depressed markets, such as the present, high rates have the effect of dividing the country into comparatively narrow zones, preventing free movements in the way of longer hauls. There are those who, associating high freight rates and depressed markets as cause and effect, maintain that unless rates are reduced it will be necessary to remake the entire geography of the country. For instance, it has been claimed that agricultural products can move under present high freight rates in this country and low ocean rates from foreign countries only to restricted points, and cannot nearly compete with foreign products along the Atlantic seaboard and for a considerable distance inland. Continuance of this situation, it is maintained, would mean nothing short of wiping out great agricultural areas and make of the United States an importer instead of exporter of agricultural products. The same, it is claimed, may be expected in iron and steel and other industrial lines and even now this is one responsible element making it possible for foreign producers to lay steel down at ports and to ship inland to considerable extent at prices which domestic makers cannot meet. This applies to the Pacific coast as well. Because of this, it is looked upon as an added and essential argument for a protective tariff higher than that which the subcommittee of metals has in mind, and to involve more than a labor problem, though the importance of labor costs as related to tariff making is not overlooked.

The Memphis Hearing

The entire railroad rate situation may be affected greatly by hearings beginning to-day at Memphis before Examiner E. L. Gaddess of the Interstate Commerce Commission. Every rate from, to and between points south of the Ohio River, including the Mississippi Valley, will be under investigation. Rates on iron and steel products will be considered on April 11. The hearing is to last two weeks, as now proposed. The proceeding is an outgrowth of the so-called Memphis-Southwestern and Murfreesboro cases. The carriers filed class rates presumably in compliance with the commission's decisions in those cases, but the commission suspended them under the claim that the rates did not meet with its decisions. The hearing will involve unusually complicated angles, but in a general way relates to relationship of rates.

Making Rapid Progress in Tariff Revision

WASHINGTON, April 5.—Specific plans for revised revenue legislation at the special session of Congress, which convenes next Monday, are lacking. There are many proposals being made and discussed, but the business world still is without definite information as to what the exact program will be because the leaders in Congress themselves have not arrived at any conclusions. The necessity of taxation reform, however, is well known to Congress and Senator Penrose, chairman of the Committee on Finance, has said that it is "almost equivalent to relief legislation for business." No concrete recommendations have been made by the Treasury Department.

It is the purpose of the Committee on Finance to begin hearings on internal revenue revision soon. Arrangement has been made with the House Committee on Ways and Means for its use of testimony given before the Finance Committee so far as this is practical. It may be necessary for the Committee on Ways and Means to hold special hearings to clear away points on

TWENTY YEARS' RECORD

Progress of the United States Steel Corporation Since Its Organization April 1, 1901

On April 1 the United States Steel Corporation completed its first score of years. On April 1, 1901, the 10 following concerns had been legally merged: The Carnegie Steel Co., the Federal Steel Co., the American Steel & Wire Co., the National Tube Co., the American Bridge Co., the National Steel Co., the American Tin Plate Co., the American Sheet Metal Co., the American Steel Hoop Co. and Lake Superior Consolidated Iron Mines. Later it absorbed other companies, particularly the Tennessee Coal, Iron & Railroad Co.

The first year the corporation mined 16,063,179 tons of iron ore, compared with 27,021,009 tons in 1920; in 1902 it made 7,975,530 tons of blast furnace products, which had increased to 14,532,646 tons in 1920; the first year its steel ingot production was 9,743,918 tons, while in 1920 it was 19,277,960; in 1902 the rolled and other finished products for sale amounted to 8,197,232 tons, compared with 14,228,502 tons last year.

At the end of 1920 the corporation had a net working capital of $595,957,623, compared with $138,110,545 at the end of 1901. In spite of expenditures of $991,257,448 for new plants and acquisition of property since organization, the corporation now carries its properties at only $1,606,758,546, against $1,383,519,500 at the end of 1901.

For 19 years and 9 months the earnings have averaged $13 a share annually for its common stock. In that time it has showed a combined surplus of $1,817,905,469 available for dividends on both classes of stock. There are now 104,376 holders of common stock, compared with 13,318 when the corporation started. Figures of common stock ownership indicate that the stock is being absorbed more and more by investors and less by speculators. At the end of 1916 brokers held 58.05 per cent; at the end of 1919, 39.65 per cent and on Dec. 31, 1920, only 25.17 per cent.

In 1902 there were 168,127 employees, the payroll amounting to $120,528,343; last year the number of employees totaled 267,345 with a payroll of $581,556,925.

The companies merging exported in the aggregate less than 300,000 tons of iron and steel products in 1901; in 1912, the best pre-war year as regards foreign shipments, the corporation shipped abroad 2,280,796 tons; in 1920 exports were 1,708,100 tons.

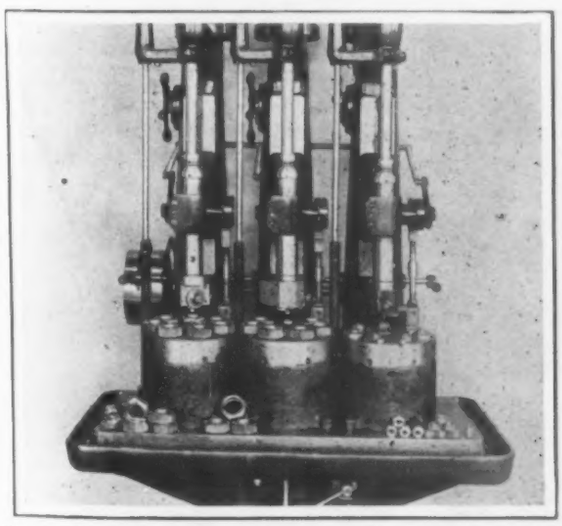
The volume of business by all the companies in 1902 totaled $560,510,479, as compared with $1,755,477,025 in 1920, the biggest year of its history.

During its first year, the corporation produced 65.7 per cent of all semi-finished steel in the United States and 50.1 per cent of finished steel, exclusive of wire nails, tin and terne plate. Its percentage of total production declined almost without interruption from year to year, being 53.9 per cent of ingots in 1911 and 53.2 per cent in 1913, while as to finished steel the figures for 1911 and 1913 are 45.7 per cent and 47.8 per cent respectively. In the same time, wire nail production declined from 65.8 per cent to 44.5 per cent and tin and terne plates from 73 per cent to 60.7 per cent. In 1919 ingot production was 49.6 per cent of the country's total, while finished steel output was 44.6 per cent, wire nails 51.9 per cent and tin and terne plate 48.4 per cent.

In the 20 years the corporation has more than doubled its capacity in all lines. Present approximate capacity is: Pig iron, 18,400,000 tons; ingots, 22,350,000 tons; finished steel products, 16,200,000 tons. It had no by-product coke plants at the beginning, and has built up a benzol and other by-products capacity of about 45,000,000 gallons.

Nut Facing Fixture for Drilling Machines

The fixtures with which the drilling machine illustrated is equipped are used for facing the top surface and bevel of hexagon cast brass valve packing nuts ranging from 1 to 2¼ in. across flats. They are designed to operate automatically and are attached to a 3 in. spindle No. 2-B Edlund drilling machine manufactured by the Edlund Machinery Co., Inc., Cortland, N. Y.



Nut Facing Fixture for Drilling Machine. The operator's duty consists merely in loading and unloading the work tables

The machine is equipped with a standard drive using four step cone pulleys, the high speed step of which is utilized to drive the automatic fixtures. Extra large spindles are used and equipped with plain hardened steel and bronze thrust bearings at the lower end, for taking the cutting thrusts. Ball thrust bearings at the upper end of the spindle are used for supporting the weight when running idle.

The automatic fixtures consist of a revolving work table, which may be indexed by a cam carried on a camshaft driven by worm gearing. The worm is attached to a vertical shaft which takes its power from the lower step of the front cone pulley, so that the drive of the fixture is governed by the previously selected spindle speed for the size of the work being faced. Thus, slowing up or stopping of the spindle affects the fixture accordingly. The camshaft also carries two other cams, one of which operates a slide for locking and unlocking the work table and the other controlling the feed of the spindle by means of the vertical turn-buckle and face shown at the right of each spindle.

The method of holding the smaller nuts during the facing operation is shown in the fixture, at the right, For the larger size nuts central plugs are employed and located around the projecting center boss so that one side of each nut will bear against it and prevent the nut from turning. The center plug for the nuts have guide holes for engaging the pilots on the tools.

The cam by means of which the spindle is fed is designed to approach the cut quickly and then feed the desired depth, allowing the tool to revolve several times after the facing operation is completed so as to give a smooth finish. After the feed has been completed the spindle is returned by springs.

The operator's duty consists merely in loading and unloading the fixtures, which can be done while indexing or during the cut. All three fixtures can be used for one size of nuts or each may be fitted to accommodate a different size. On one-inch nuts the production is said to be 100 per hour with all three fixtures in operation on the same size, a spindle speed of 1273 r.p.m. and a feed of 0.0006 in. For large size nuts, 2¼ in. across flats, the output is given as 42 per hour at 510 r.p.m., and for nuts of medium size, 67 per hour at 816 r.p.m., the same feed (0.0006 in.) in all cases.

Washington advices are to the effect that the Government has decided to dispose of its property at Ancor, Ohio, near Cincinnati, purchased during the war for the construction of a nitrate plant. The entire property, including land and buildings, will be offered for sale by public auction on April 15 and 16.

CUTTING UP GERMAN GUNS

Demolition of Kiel Armament by Oxy-Hydrogen Torch

BY C. A. HEISE

Some of the steps taken for the disarmament of Germany, partly under the supervision of the Inter-allied Commission in Germany, are shown in the accompanying pictures taken at different fortresses and shore defenses located at the Kiel creek—Friedrichsort, Falkenstein, Herwarth, Stohl, Jaegersberg, Stosch, Stein, etc. Some of these were, however, somewhat obsolete and it seems rather doubtful whether they would have proved of much fighting value against modern naval guns in the event of a bombardment, excepting perhaps the shore battery Stohl, which was built in 1915 at a cost of 5 million marks and was equipped with 12-in. guns of modern design.

The work of dismantling the Kiel fortifications was turned over to two firms of contractors, while the "Draegerwerk" at Luebeck supplied the oxy-hydrogen cutting outfits. The whole process of destruction was rather simple. The battlements and cupolas having been blasted, the guns were dismounted and platform as well as carriage parts and barrels cut up into sizable parts for the melting furnace. The sequence of operations was usually as follows: First of all the muzzle portion was cut off, the thickness of the walls ranging between 5⅞ in. and 7 in. The second operation consisted in freeing the core by "peeling off" the rings, the average thickness of which was 4¾ in. Both longitudinal and circular cuts were taken and no undue efforts were made to obtain straight-line cuts. In the third and last operation, the core was separated into sizable parts by circular and longitudinal cuts.

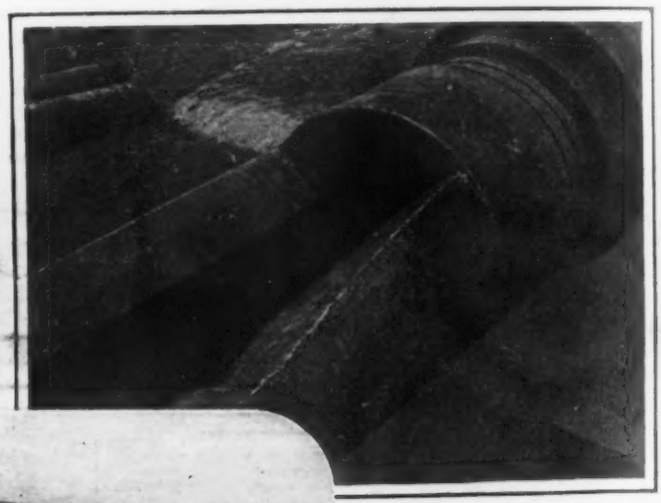
An analysis of the gun steel, which in some cases had a thickness up to 12 in., showed the following composition by percentages: Carbon, 0.42; silicon, 0.20; manganese, 0.21; phosphorus, 0.05; sulphur, 0.027; copper, 0.26. The destroyed material also included ship armor plate, an analysis of which showed the following composition:

Armor Plate, 5.905 In.

	Percentage		
	Top	Middle	Bottom
Carbon	0.22	0.24	0.29
Silicon	...	0.15	0.15
Manganese	0.30	0.30	0.30
Phosphorus	0.03	0.03	0.03
Sulphur	...	0.032	0.032
Nickel	3.20	3.20	3.20
Chrome	1.87	1.87	1.87

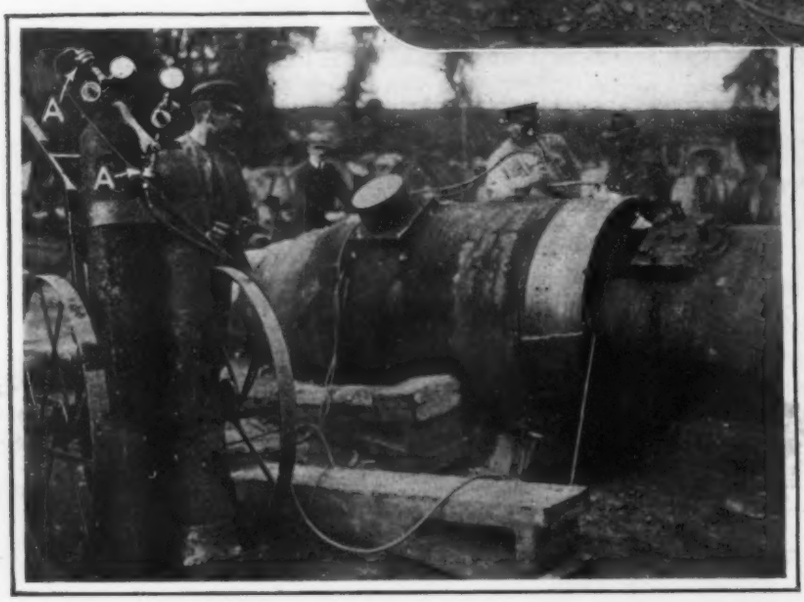
Armor Plate, 11.811 In.

	Percentage		
	Top	Middle	Bottom
Carbon	0.60	0.37	0.30
Silicon	...	0.09	...
Manganese	0.26	0.26	...
Phosphorus	0.055	0.055	0.053
Sulphur	0.07	0.07	0.07
Nickel	3.00	3.00	3.00
Chrome	1.53	1.51	1.53



Core of an 11-in. Gun at the Stosch Fort, Cut Open

Cuts of 5.9-in. Guns at the Stein Fort



At Left, Cutting Outfit at an 11-in. Gun at Friedrichsort, A,A, Being Safety Cartridges Against Back Firing

Season-Cracking of Brass and Other Alloys

Contribution by British Institute of Metals on Cracking of Cold Drawn Material—Changes in Aluminum Sheets on Heating

LONDON, ENGLAND, March 12.—An important paper on season-cracking of brass and other copper alloys marked the meeting of the Institute of Metals held in this city March 9 and 10. The paper was presented by H. Moore, S. Beckensale and Clarice E. Mallinson, of the Research Department at Woolwich Arsenal. Numerous specimens of brass in which season-cracking has occurred have been examined and an investigation made of the causes of season-cracking, the detection of liability to fail in this way, the mechanism of the process by which the cracks form and develop, the effects of variations in composition, structure, and physical properties such as hardness, and the prevention of season-cracking. Among the more important conclusions are the following:

Season-cracking occurs in a great variety of industrial brasses, but only in material which is maintained in a state of stress, either by external constraint or more commonly by internal stress. Corrosion of the surface and sometimes of the walls of the cracks is frequently associated with season-cracking, but corrosion effects are not always visible. Season-cracking may occur in brass coated with continuous protective layers such as lacquer, though nickel-plating is probably completely effective in preventing season-cracking, if a sufficient and continuous coat of nickel is secured.

Highly-stressed articles, capable of developing season-cracks in certain conditions, may be kept for years in reasonably pure atmospheres without showing any sign of cracking, and there appears to be no reason to anticipate the development of cracks so long as the condition of the surrounding atmosphere does not change.

Mercury, ammonia and ammonium salts readily produce cracks in brass which is sufficiently stressed in tension. It is probable that traces of ammonia in the atmosphere are an important agency, and possibly the main agency, inducing season-cracking of stressed brass. Surface defects do not appear to contribute to the development of season-cracks in brass to any important extent and corrosion does not necessarily favor their development.

Season-cracks almost invariably follow an intercrystalline path, and the cracks produced in stressed brass by mercury or by ammonia are of the same intercrystalline type. Ammonia appears to have a specific and selective action upon the intercrystalline material of brass, weakening it sufficiently to cause cracking if in tension. Mercury has a similar intercrystalline weakening action.

The greater the degree of hardening by cold work, the less is the brass affected by the intercrystalline weakening action of ammonia or mercury, although it is possible that weakening may occur whatever the degree of hardness of the brass.

It is probable that the behavior of a copper alloy submitted to the combined effect of tension and of ammonia or mercury is a reliable index of its liability to fail by season-cracking. This liability appears to diminish as the zinc content of the brass is reduced. Copper and zinc-copper alloys containing less than about 10 per cent of zinc are unlikely to fail by the development of season cracks in service.

Low Temperature Annealing Important

A suitably controlled low temperature annealing which will remove stress sufficiently to insure freedom from season-cracking with little or no effect on the hardness appears to be the most effective safeguard against failure by season-cracking and might well be applied to all brass articles made by cold work operations capable of inducing permanent internal stress.

This study of season-cracking and of the action of mercury and ammonia on stressed brass affords strong support to the hypothesis of an intercrystalline material differing essentially in its properties from the crystals themselves. For example, in a pure alpha brass the intercrystalline material appears to be attacked by ammonia or by mercury much more rapidly than the crystals. The presence, on spun cups and on other cold-worked articles, of a layer which retards the intercrystalline weakening action of both mercury and ammonia, is an interesting confirmation of the view that the intercrystalline material is similar in its properties to the amorphous film produced by surface flow.

The undoubtedly intercrystalline character of season-cracking in brass appears to be fully explained by the selective weakening action of a chemical substance on the intercrystalline material. The authors are unable to find in the results of their work any evidence indicating that season-cracking is the result of viscous flow of the intercrystalline cement. In this particular their view of season-cracking in brass differs from that of Rosenhain and Archbutt, although there is agreement in so far as their explanation is also based on the assumption of an intercrystalline material probably identical in its properties with Beilby's amorphous phase found in surface films.

Discussion

H. MOORE, summarizing the paper, said the important feature was the stress laid on chemical action in promoting season cracking, due to ammonia and other substances which acted as accelerating agents in promoting corrosion.

SIR GEORGE GOODWIN said that, whatever might be the other causes, corrosion was undoubtedly a factor. If so, he would like to know why the cracking, although common in brass tubes, rarely occurred in cold drawn steel tubes, and was practically unknown in copper tubes in the condition as received by engineer users.

DR. W. H. HATFIELD said the paper added materially to our knowledge of the subject, and agreed with the authors that the cracking was due to chemical action rather than general corrosion. The most important conclusion was that the liability to season-cracking appeared to diminish with a reduction in the zinc content of brass. He disagreed with the authors when they referred to an intercrystalline material probably identical in properties with Beilby's amorphous phase as developed in surface films. He demonstrated by means of lantern slides that the crystalline material was equally attacked with the "hypothetical, amorphous material" during etching.

DR. WALTER ROSENHAIN said that with certain chemical substances there was a selective chemical action along the crystal boundaries which he had always felt was the main operative cause of season-cracking, combined with a certain amount of stress. He differed from the authors in thinking that it was not the only cause. If so, why did not unstressed brass exposed to mercury for some time fall to pieces? It did not, and the authors admitted as much. The presence of stress was necessary for penetration through the amorphous material due to flow exposing fresh surfaces to attack. In his joint paper with Archbutt he had shown season-cracking produced at any desired speed and also material put into such condition that it did not crack at all. In the aluminum-zinc alloys the presence of air accelerated season-cracking, but was not essential, and by suitable heat treatment the alloys could be put into a condition in which it would not crack. The theory of chemical action alone would not do. As regards Dr. Hatfield's objections, he pointed out that season-cracking was essentially a slow yielding

to a slowly applied load so that shock tests, as used by Dr. Hatfield, did not apply at all.

SIR GERARD MUNTZ thought that season-cracking was closely allied to fire-cracking. As all manufacturers knew, fire cracks could be obtained without any possibility of corrosive influences, and the defects were exactly the same as season-cracks. The prime cause in both cases was a difference between the internal and external strain, while corrosion or chemical causes were secondary. The speaker demonstrated the strains produced in a brass rod by being passed through a die. If the surface were then turned in a lathe the bar would break, while corrosion produced the same effect by weakening the skin. Another cause of bursting in such bars was variation in the temperature of the store room. Internal stress in the metal was the prime cause of season-cracking, which took place when the small safety margin in the strained metal was removed by chemical or other action.

DR. O. F. HUDSON thought that most of the phenomena could be explained by assuming that there was no amorphous material at all and that alloys in which season-cracking occurred were naturally weaker between the crystals than those in which it did not.

PROF. C. H. DESCH said the important fact in all these phenomena was the selective action of certain chemical reagents, especially mercury and ammonia. Other reagents, such as acids, had no effect on brasses liable to crack. Even the selective reagents, however, only revealed pre-existing weaknesses and did not originate season-cracking. He thought the conditions at the crystal boundaries were governed entirely by surface tension and he could never realize an amorphous layer more than 2 molecules thick. Evidently the reagents in question had a peculiar effect in modifying the surface tension, and the action was not purely chemical.

PROF. T. TURNER agreed broadly with Professor Desch, and pointed out that season-cracking occurred only in some metals and alloys, and only in a limited range.

Season-Cracking Not in Rolled Material

F. TOMLINSON said that if material liable to season-cracking were heat-treated at about 250 deg. C. the stresses were removed and cracking did not occur. Season-cracking and fire-cracking were similar but time was an important factor, as pointed out by Dr. Rosenhain. Season-cracking did not take place in rolled material, but was liable to occur in cold-drawn rods or tubes.

O. W. ELLIS observed that he had had over two million rods through his hands during the last five years, and in some cases a consignment of rods had developed cracks within 2 or 3 hr. of delivery. It was not feasible that this could be due to the action of ammonia, and he thought season-cracking could not occur unless stresses were set up in the material.

MR. MOORE, in reply to the discussion, said that something similar to season-cracking occasionally occurred in steel. He was still of opinion that viscous flow was not necessary, in spite of Dr. Rosenhain's arguments, and thought there was ample evidence in support of their view that season-cracking was due to chemical action on material which was in a state of stress. Season-cracking, he agreed, could be prevented by correct heat treatment and there was no justification for a manufacturer to allow material to leave his works in a condition liable to failure from that cause.

Continuous Electrolytic Deposition of Calcium

A paper on calcium by P. H. Brace, East Pittsburgh, Pa., gave a brief historical survey of the development of the metallurgy of calcium and described a type of apparatus developed by the writer for the manufacture of the metal, which is obtained by the electrolysis of fused calcium chloride. The electrolyte is first melted by means of an alternating current, and when a small pool has been formed, direct current is switched on, and as the metal deposits on the cathode the latter is slowly withdrawn from the bath. Further deposition takes place on this calcium, which itself is withdrawn at such a speed that a continuous rod of the metal is formed. A summary of the more important uses of calcium, including the preparation of certain aluminum alloys, is given in the paper.

High Temperature Deformation

A paper by Prof. C. A. Edwards and A. M. Herbert, Swansea, Wales, was entitled "Plastic Deformation of Some Copper Alloys at Elevated Temperatures." The object of the investigation was to determine the plasticity of certain copper-aluminum and copper-zinc alloys at temperatures between zero and 900 deg. C. In most, if not all, previous investigations dealing with this subject the observations have been made by means of one of the well-known methods of testing under static loads. In the present work, however, dynamic stresses have been applied by means of a falling weight to which was attached a 10 mm. steel ball. The degree of plasticity was calculated from the size of the indentations produced in the specimens by the ball.

The results obtained give unmistakable indications of pronounced changes in the plasticity of both series of alloys at temperatures which correspond with structural transformations that are known to occur in the respective series. It may seem rather curious that the same kind of evidence does not seem to be obtained when a static test is used, but such appears to be the fact.

The difference in this respect is no doubt due to the influence of the time factor. With dynamic stresses the time factor is, of course, reduced to a minimum, while with the static method the best that can be done is to attempt to standardize this variable. When tests are being made at different temperatures any particular standard rate of loading which may be selected will have the effect of introducing an additional uncertainty because the effect of time also varies with the temperature. Therefore, the static method of testing can scarcely be expected to give clear indications of a change of properties corresponding with a constitutional change in the metal. Further the static method can only give results that are of real practical value where the materials are to be subjected to slowly applied stresses. The significance of this will be appreciated when it is remembered that in most commercial operations, such as forging, hammering, rolling and extruson, the stresses are applied at phenomenally rapid rates. Hence plasticity determinations under dynamic stresses are much more likely to give data that are comparable with the above-mentioned practical operations than those from static tests.

A comparison of the results obtained in the present work with those previously published of other investigators strongly supports this view.

F. TOMLINSON in the discussion said the investigations would have important practical results in rolling, extruding and forging.

DR. G. D. BENGOUGH thought that enough tests at high temperatures had not been made, either static or dynamic, to be definitely correlated with the working properties of metals, but with more tests either or both methods would probably prove of practical value.

DR. W. ROSENHAIN said such tests might be of importance in determining the best working temperatures for metals, but for actual use the tensile test was probably to be preferred to the impact test of the authors.

Recrystallization of Aluminum Sheets

Prof. H. C. H. Carpenter and Miss C. F. Elam, of the Royal School of Mines, are joint authors of a paper on "Stages in the Recrystallization of Aluminum Sheet on Heating, with a note on the Birth of Crystals in Strained Metals and Alloys," which details the results of further investigations on crystal growth, following on work already presented in previous papers. The investigation has been designed to throw as much light as possible on the structural changes which accompany the gradual softening of cold rolled aluminum sheet on heating.

The sheet was prepared from a casting measuring 21 x 9 x 4¾ in., which was rolled by various steps down

to ⅛ in. This sheet represents a reduction in thickness of 97 per cent. Statements have been made by two previous investigators, namely, Brislee and Anderson, that aluminum loses its crystalline structure on working and becomes completely amorphous. The present authors show that this statement is incorrect. Even in the cold rolled sheet the crystals, though very much flattened and to some extent driven into one another, retain their identity.

The authors find that there are three distinct types of structure produced on heating this sheet.

Type 1 is characteristic of metal heated for long periods at 200 deg. C. and for short periods at 250 deg. C. and 300 deg. C. It is the first visible structural change and is characterized by a general tarnishing of the surface, a granular structure, and a blurring of the original boundaries of the flattened crystals.

Type 2 is the birth of new crystals in the old boundaries. These always appear white in contrast with the tarnished un-reoriented crystals. Characteristic of this type is the presence of new and old crystals in the same specimen. Examples of this are the early stages of recrystallization at 250 deg. and 300 deg. C.

Type 3 is the structure finally obtained after heating to structural equilibrium at a given temperature. Of this there are two distinct forms depending on the temperature at which they are produced.

(a) The crystals are very much elongated in the original direction of rolling and there is always a tendency for some of them to darken on etching. Prolonged heating at 250 deg. and 300 deg. C. produces typical examples of this sub-class.

(b) The crystals approximate more nearly to the equi-axed condition the higher the temperature, though even at the highest temperature they still show a slight elongation in the direction of rolling. There is little or no tarnishing of the crystals. Examples are specimens heated at 450 deg. to 600 deg. C.

Specimens heated at 350 deg. to 400 deg. C. furnish examples in each of the sub-classes *a* and *b*. In the early stages they resemble *a* and in the final stage *b*.

Working on Testing Codes

Nineteen codes in the field of power plant testing are being developed by the American Society of Mechanical Engineers. At the Spring meeting of the society in Chicago, May 23 to 26, three codes will be presented for consideration.

One of these for reciprocating steam engines was prepared by a committee of which W. C. Brown of the Stumpf Una-Flow Engine Co., Inc., Syracuse, N. Y., was chairman. He was aided by Prof. A. G. Christie, Johns Hopkins University, Baltimore; Harte Cooke, McIntosh & Seymour Corporation, Auburn, N. Y.; Prof. Herman Diederichs, Cornell University; J. F. M. Patitz, Allis-Chalmers Mfg. Co., Milwaukee; and Prof. F. H. Vose, Case School of Applied Science, Cleveland. Another of the codes is intended primarily for the testing of apparatus heated by steam, such as vacuum pans, or single and multiple-effect evaporators. The committee in charge of this code is headed by E. N. Trump, Solvay Process Co., Syracuse.

The other committees which are at work on Test Codes under the direction of the following chairmen are: Definitions and values, R. J. S. Pigott, Crosby Steam Gage & Valve Co., Boston. Fuels, Dean C. R. Richards, College of Engineering, University of Illinois, Urbana, Ill. Boilers, E. R. Fish, Heine Safety Boiler Co., St. Louis. Steam turbines, J. W. Parker, Detroit Edison Co., Detroit. Reciprocating displacement pumps, L. E. Strothman, Richardson-Phenix Co., Milwaukee. Centrifugal and rotary pumps, W. M. White, Allis-Chalmers Mfg. Co., Milwaukee. Displacement, compressors and blowers, Paul Diserens, Worthington Pump & Machinery Corporation, New York. Centrifugal and turbo-compressors and blowers, C. H. Smoot, Rateau Battu Smoot Co., New York. Complete steam power plants, N. A. Carle, Public Service Electric Co., Newark. Condensers, water heating and cooling equipment, G. J. Foran, Worthington Pump & Machinery Corporation, New York. Refrigerating machines and plants, Prof. R. M. Anderson, Stevens Institute of Technology, Hoboken, N. J. Locomotives, Prof. J. M. Snodgrass, University of Illinois, Urbana. Gas Producers, Prof. W. T. Magruder, Ohio State University, Columbus. Internal-combustion engines, Prof. C. E. Lucke, Columbia University, New York. Hydraulic power plants, W. F. Uhl, 201 Devonshire Street, Boston. Instruments and apparatus, C. F. Hirshfeld, Detroit Edison Co., Detroit.

Industrial Film Service

Two new educational motion picture films are announced as being ready for distribution by the United States Bureau of Mines.

"A Dollar Saved Is a Dollar Earned" is the title of a film produced in co-operation with the National Association of Pipe Covering Industries. This film shows the advantages and economy that result when pipes and boilers are properly insulated and the radiation losses are thus overcome.

"A Story of Ingot Iron," a three-reel picture showing the various steps in the process of making ingot iron for plates and sheets, was produced in co-operation with the American Rolling Mill Co., Middletown, Ohio.

Requests for the loan of these films should be addressed to the Bureau of Mines, 4800 Forbes Street, Pittsburgh.

Rapid Furnace Construction at Warren

An illustration of active construction work is afforded by the operations at Warren, Ohio, where the building of the 600-ton blast furnace for the Trumbull-Cliffs Furnace Co. is being pushed at a rapid rate. In fact, according to Freyn, Brassert & Co., consulting engineers on the work, it is expected that the progress will constitute a record from the standpoint that it involves a complete plant construction, the owners starting on a clear site of farm land without connection to the railroad across the Mahoning River and requiring all accessories, such as ore yard, bins, blowing equipment, boiler plant, etc. D. T. Croxton is in charge of construction and purchases for the Trumbull-Cliffs company.

Canadian Steel Merger Progressing

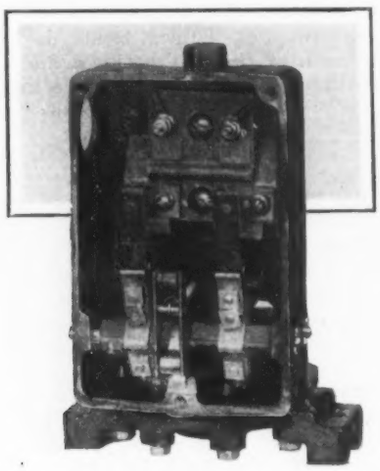
Directors of the Dominion Steel Corporation and the Nova Scotia Steel & Coal Co. met in Montreal, Canada, to discuss the proposed amalgamation of the two companies with the Halifax Shipyards in the British Empire Steel Corporation. After the meetings of the two boards it was announced that both boards had approved of the contracts covering the consolidation and that special meetings of both the Steel Corporation and Nova Scotia company shareholders would be called for April 7 to pass upon the recommendation of the directors in this respect.

The basis of exchange of the common stocks of the three companies to constitute the British Empire Steel Corporation is as follows: Each fully paid ordinary or common share of the Dominion Steel Corporation will be exchangeable for $95 of fully paid 7 per cent cumulative second preference shares and $40 fully paid common stock in the British Empire Steel Corporation. Each fully paid common share of the Nova Scotia Steel & Coal Co. will be exchangeable for $90 fully paid 7 per cent cumulative second preference shares and $40 common shares of the new corporation. Each $100 fully paid common share of the Halifax Shipyards will be exchangeable for $60 7 per cent cumulative second preference shares and $25 common stock of the British Empire Steel Corporation.

Pressure-operated Switch

A pressure regulator of the diaphragm type, which is an improvement over its previous designs, is being marketed by the Cutler-Hammer Mfg. Co., Milwaukee. It has been developed for use with motor-driven pumps and compressors operating on closed pressure systems. The switch automatically starts and stops the pump or compressor as the pressure falls or rises to a predetermined minimum or maximum.

The air, water or other fluid under pressure is conducted into a chamber in the base of the regulator. The pressure acts against a rubber diaphragm and compresses a spiral spring, the normal compression of which can be changed by means of an adjusting nut to obtain various values of opening pressures up to 60 lb. per sq. in. When the switch is closed and the pump



Pressure-Operated Switch with Cover Removed, Exposing the Terminals and Fingers

or compressor operating, the pressure builds up, and when the adjusting spring has been compressed to a certain point, the switch snaps open and stops the motor. When the pressure has fallen to a predetermined point, the switch closes with a quick action and the pump or compressor again operates to build up the pressure system.

This make-and-break action of the switch is accomplished by an arm carrying a roller which is held in tension against a cam mounted on the operating shaft of the switch. The movement of the adjusting spring is transmitted to the roller which moves along the surface of the cam. When the opening or closing pressure is reached, the roller passes a peak on the cam and gives the latter a quick turn, thereby opening or closing the switch. A good contact pressure is maintained up to the instant the switch is opened. The difference between opening and closing pressures is about 20 lb.

The regulators are at present made for 60 lb. maximum service, and it is expected that they will shortly be provided for use on systems up to 200 lb. pressure.

Use of Steel in Umbrellas

Practically all of the umbrella frames manufactured in the United States are produced by four companies, three of which are located in Philadelphia, and one in Newark, N. J. All of the manufacturers of umbrellas buy their frames from these four companies.

While this industry is not a large user of steel, its total consumption of wire and sheets is quite substantial considering the light weight of the finished product.

One large Philadelphia manufacturer of umbrella frames uses approximately 2500 tons of high carbon steel rods, 350 tons of soft basic rods and 360 tons of Bessemer sheet steel in its own plant per year. Another manufacturer estimates that the entire industry consumes annually about 1500 tons of sheets and about 1500 tons of rods, sometimes called Paragon wire.

High carbon rods are used to produce wire for the manufacture of ribs and stretchers, while soft basic rods are used in the manufacture of the runners, notches and various other small parts used on frames. Bessemer sheets are used for the manufacture of the steel rods.

British Steel Exports Very Low in February—Imports Heavy

British steel exports in February, this year, excluding iron ore and including scrap, were 167,158 gross tons as compared with 233,144 tons in January. The February exports last year were 231,065 tons. The average per month in 1920 was 274,881 tons per month while in 1913 it was 420,757 tons per month. The 1919 rate was 188,519 tons per month. The February outgo is therefore less than even the 1919 monthly average. Imports in February were 181,565 tons which contrast with 196,945 tons in January, and with 128,685 tons per month in 1920. The 1913 imports were 195,264 tons per month.

Expressed as a table the exports and imports in January and in previous years were as follows in gross tons:

	Exports	Imports
January, 1921	233,114	196,945
February, 1921	167,158	181,565
Average per month, 1919	188,519	50,801
Average per month, 1920	274,881	128,685
Average per month, 1913	420,757	195,264

The trend of some of the principal exports is shown by the following data in gross tons:

	Average per Month 1913	Average per Month 1920	Feb., 1920	Feb., 1921
Pig iron	78,771	38,505	60,990	11,833
Steel rails	41,676	11,213	5,085	15,337
Steel plates	11,162	16,571	16,476	23,060
Steel bars	20,921	30,322	18,055	13,642
Galvanized sheets	63,506	34,244	24,757	8,017
Tin plates	41,208	29,418	21,751	21,518
Black plates	5,679	3,026	3,666	830

The February exports of steel rails and steel plates exceeded the 1920 monthly rate, all others showing a decline which was pronounced in galvanized sheets and pig iron.

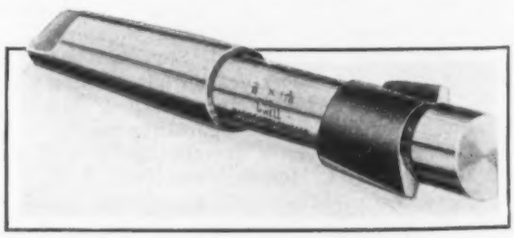
Pig iron imports in February were 11,508 tons as compared with 13,148 tons in February, 1920. The monthly average imports in 1920 and 1913 were 12,705 tons and 18,059 tons respectively.

Iron ore imports in February were 274,204 tons sa compared with 541,742 per month in 1920. Ore receipts are 33 per cent larger thus far this year than last.

Manganese ore imports were 35,193 tons in February against 37,717 tons per month in 1920 and 50,098 tons per month in 1913. The total for the first two months of this year is 83,505 tons against 50,185 tons for the same two months last year.

Counterbore of New Design

Designed to permit of counterboring on a production basis, the new Cutwell counterbore recently put on the market by the Bickford-Switzer Co., Greenfield,



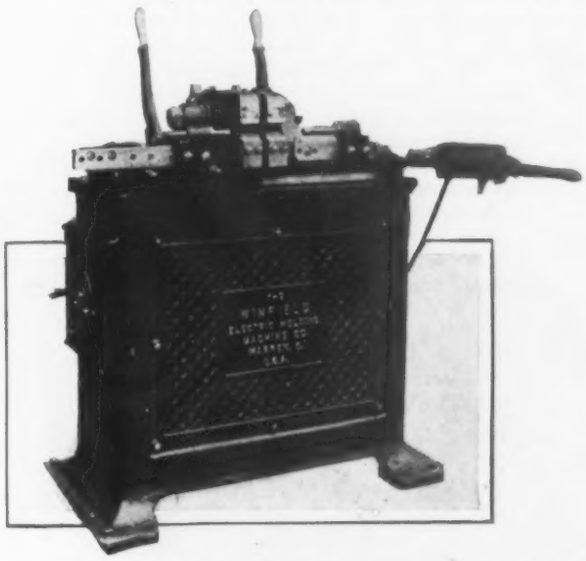
Counterbore Designed with Clearance and Spiral Flutes for Rapid Production

Mass., is of the two-lip type and represents a departure from the usual construction. It is claimed that because of the ample clearance and spiral flutes incorporated in this design, faster production than usual may be realized. It is further claimed that chattering of the tool is eliminated. The cutting action is similar to that of a drill and the chips produced are like those obtained from drilling. There is room for convenient resharpening of the cutting lips, and either lip is sufficiently strong to do the operation if the resharpening has been carelessly done.

Welder for High Speed Drills

A new electric butt welder with overhang designed especially for high-speed drills and taking ¼-in. to ¾-in. round stock or its equivalent is being placed on the market by the Winfield Electric Welding Machine Co., Warren, Ohio. It is said to have been originally designed for flash welding high-speed drills for the National Twist Drill & Tool Co., and to be so constructed that the flash from the weld is prevented from getting into the movable parts and bearings.

The electrical features include a 15-kw. transformer and six-step self-contained regulator. The switch is



Electric Butt Welding Machine Designed Especially for Welding High Speed Drills. Movable bearings are protected by felt to prevent particles from the flash getting into them

located on the hand lever and is set by thumb latch and automatically tripped when the weld is made. Water circulates through all the copper terminals and in changing dies it is not necessary to break the water connections.

The lower dies are of copper, the upper dies of tool steel. They are set to the front of the machine so that work can be more readily placed on them and so that the flash is away from the bearings and slides. The work is clamped in the dies by hand and a single toggle hand lever used for upsetting welds. The left-hand slide is adjustable to regulate the amount of take-up in the welds, as well as for aligning the work in all directions. Adjustable stops are provided for backing up the work.

Upsetting slides are faced with hardened steel plates and all bearings have hardened steel bushings and pins, protected with felt wherever possible. This construction is intended to prevent fine particles from the flash getting into the bearings and grinding them out. Clamping levers are placed well back of the dies and clear of the flash, clamping the work by means of hardened steel cams, with no toggles used.

The machine is self contained and occupies 42 x 40 in. of floor space. The height to the dies is 36½ in., the over-all height being 56 in.

Protection in England

WASHINGTON, April 5.—A customs duty of 33 1/3 per cent ad valorem for five years for key industries of the United Kingdom is proposed by the British Government. It would apply for five years as a matter of protection, and among other products would include tungsten, scientific instruments and magnetos. Information to this effect has been cabled by Consul General Skinner at London. It is stated that a further duty of 33 1/3 per cent may be added to any other duties on articles which are sold or offered for sale at prices below the production cost, or at prices which, because of currency depreciation, are below the prices at which similar goods can be produced in the United Kingdom.

Structural Steel Relatively Low

In the March number of the Monthly Labor Review the Government's figures on prices of building materials show that, with the sole exception of red cedar shingles, structural steel is nearer the 1913 price than any other of the 21 items listed, while it is far below the weighted average of all items. Its peak, reached in June, 1917, was lower than the average peak (index number 331 compared with 341 average) and its recession from the peak advance over 1913 figures was 73.1 per cent in January.

Based on 100 as the 1913 average, some of the items show as follows:

Prices quoted for the steel items were:

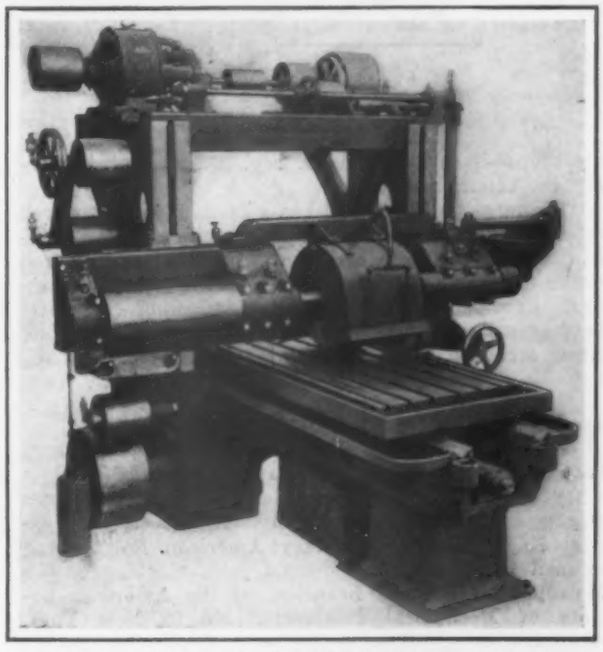
	1913 Average	Peak	Jan., 1921
Structural steel, 100 lb.	$1.51	$5.00	$2.45
Reinforcing bars, 100 lb.	1.376	4.50	2.35
Wire nails, 100 lb.	1.819	4.60	3.35

Item	Index Number of Price At Peak	Jan., 1921	Percentage of Drop From Peak	Of Advance
All building materials	341.0	239.0	29.9	42.3
Structural steel*	331.0	162.2	51.0	73.1
Reinforcing bars*	327.1	170.8	47.8	68.8
Wire nails	252.9	184.2	27.2	44.9
Common brick	251.1	251.1	0	0
Gravel	340.4	340.4	0	0
Portland cement	326.8	293.2	10.3	14.8
Douglas fir	407.3	168.3	58.7	77.8
Hemlock	235.3	198.1	15.8	27.5
Red cedar shingles	346.8	116.9	66.3	93.2
Plate glass	329.5	329.5	0	0

*Peaks occurred in June and July, 1917; all others in 1920.

Oscillating Surface Grinder

A heavy duty, self-contained, motor-driven oscillating surface grinder has been recently brought out by the Springfield Mfg. Co., Bridgeport, Conn. The



The Spindle Is Driven Directly from the Motor and Oscillated by Means of a Crank

machine carries two 20 x 6½-in. wheels mounted on a spindle which is 3½ in. diameter and operates in bearings 18 in. long. The spindle is driven directly from the motor, the belt running over a drum pulley keyed to the spindle. The spindle is oscillated by means of a crank on the right-hand end of the cross rail.

The machine illustrated has capacity to grind work 5 ft. long, 30 in. wide and 18 in. high, taking 52 in. between uprights. The weight of the machine as shown is 15,645 lb.

The Stamford Rolling Mills Co., Stamford, Conn., rolled sheet metal, has increased its operating time 50 per cent. Much of the company's product is used in the manufacture of automobiles.

Shear Blade and Face Grinder

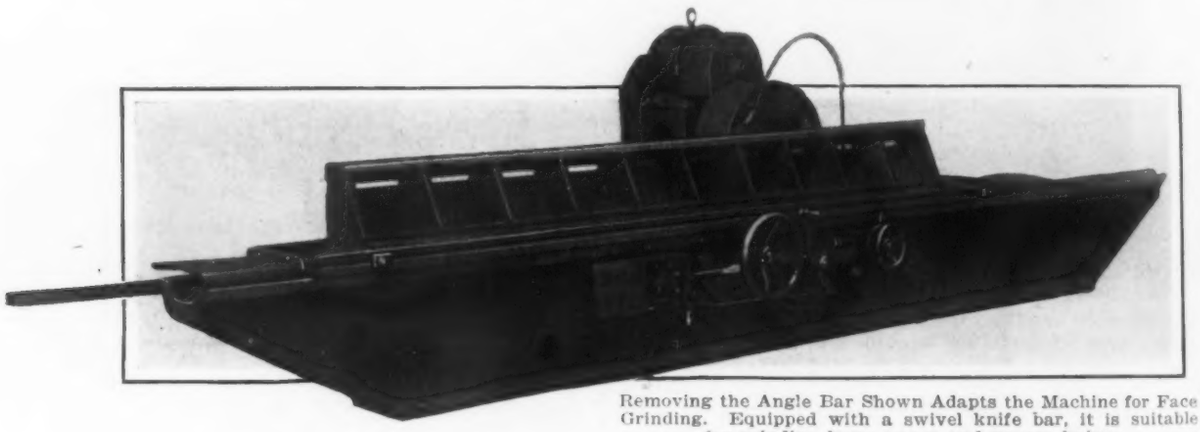
A self-contained, heavy-duty, reversing motor shear blade and face grinder made in varying lengths to handle work from 6 to 17 ft. is being marketed by the Springfield Mfg. Co., Bridgeport, Conn.

The machine is operated by three motors; a 15-hp. motor for driving the grinding wheel, a variable speed 5-hp. motor for driving the table traversing mechansim, and a ½-hp. motor for driving the pump. The variable speed motor permits of variations in table speed from 7 to 27 ft. per min., and the reversing feature of the motor dispenses with all belting. The operation of the machine is controlled from either front or rear by mechanical means, push buttons being provided for controlling the motors.

The machine can also be furnished with a swivel knife bar, making it suitable for grinding large paper and veneer knives, and by removing the angle bar shown it becomes a standard face grinder and can be used for all kinds of face grinding within its capacity.

The bearings are of the sleeve-flange type, fitting into bored holes and bolted in place by a flange. They are bronze-bushed and can be replaced without disturbing the original alignment.

The machine illustrated has a 24-in. diameter wheel, capacity to grind work 12 ft. long and weighs 14,750 lb. As shown, it is arranged for wet grinding and provision is made to take care of the spray and drainage. Provision is also made for swiveling the wheel head by means of rack and pinion, to permit of grinding either straight or concaved as may be desired.



Removing the Angle Bar Shown Adapts the Machine for Face Grinding. Equipped with a swivel knife bar, it is suitable for grinding large paper and veneer knives

Unsolved Production and Cost Problems

That the productive possibilities of many plants have not been realized and that ignorance of costs is a source of widespread economic waste in industry was discussed by L. W. Wallace, president Society Industrial Engineers and secretary American Engineering Council in an address before a joint meeting of the Metropolitan Student Branches of the American Society of Mechanical Engineers held in New York, April 1.

"Authorities quite agree," he said, "that few plants produce more than 70 per cent of the possible and many plants have a productive effectiveness of only 25 or 30 per cent. In any plant congested areas and idle equipment and labor are to be observed.

"How to bring the plants that are realizing only 25 or 30 per cent production up to even 70 or 80 per cent is not known. There are many angles to the problem; capitalization, competent personnel plant location, plant equipment and management, and other factors that must be considered. We know a good deal about many of these things, indeed information may be available whereby one may solve any and all phases of the problem. But this information is not adequately codified, correlated or disseminated, so that the industrial mass knows of it or comprehends its importance. How the material is to be assimilated and the facts to be disseminated and the industrialist taught to appreciate its value and the necessity for using it—is yet to be answered.

"How to instruct plant managers so that they will have a full comprehension of the essentialness of an adequate cost control system is one of the unsolved problems of industry of great magnitude. There is adequate information to be had and machinery to be applied; but to arouse enthusiasm for its application is the real problem."

Economic Loss in Present Elevator Design

L. W. Wallace, president Society Industrial Engineers and secretary American Engineering Council, in an address before a joint meeting of the Metropolitan student branches of the American Society of Mechanical Engineers, held in New York April 1, referred to the widespread practice of building passenger elevators to special order as an economic loss.

"The architect, the contractor, the engineer," he said, "does not design the building around the transportation medium, which is a most important factor, but the transportation medium is placed wherever it may happen to be convenient." The result of this, he pointed out, is that a special elevator has to be built to fit the space that happens to be convenient. "The economic loss through designing, constructing, installing and operating elevators under such a system of management is very large annually."

He said that until recently no one had studied this problem, the correct solution of which would affect 6,000,000 daily passengers in New York alone.

Exports of Machinery and Steel from San Francisco in February

SAN FRANCISCO, March 30.—The statistical statement of the Customs District of San Francisco indicates that the volume and value of exports of machinery and parts, engines and parts from this port during February fell off considerably from January's record. Pipe, cast and wought iron, on the other hand, were moved from the district of San Francisco to export markets in greater volume than during the first month of the year. In the case of steel plates and sheets, the volume was greater in February, but the returns sharply less.

The following figures will show the relative exports for the two months:

	January		February	
	Pounds	Value	Pounds	Value
Machinery and parts	.....	$502,625	.....	$420,658
Engines and parts..	.....	176,677	.....	64,176
Pipe, cast and wrought iron	1,090,173	77,889	1,470,157	113,554
Steel plates and shapes	2,603,137	240,980	2,894,363	128,090

Bonds have been sold for a steel bridge to be built at Youngstown, Ohio, known as the Belmont Avenue viaduct, to cost $270,000, which will require a fair tonnage of structural steel. No contracts have been awarded.

Quick Action on Tariff Is Planned

Proposed Joint Resolution Would Make New Law Effective from Date of Introduction—Steel Manufacturers Are Heard

WASHINGTON, April 5.
THE IRON AGE BUREAU,
816 Fifteenth Street.

OF outstanding interest in connection with the work during the past week of the House Committee on Ways and Means in preparing a permanent tariff act was the drafting of a joint resolution by influential members of the committee making the duties to be carried in the new law effective from the day the bill is introduced in the House. Inasmuch as Chairman Fordney has said that it is hoped to introduce the legislation by May 1, this means that, if the resolution is acted upon favorably by Congress, the United States Government will be upon a new tariff basis within less than one month, granting that the bill is reported to the House at the time suggested. Judging from the progress made by subcommittees toward framing schedules, this will be done. They entered upon their task with the intention of expediting it and have even exceeded their own expectations. Uncertainties surrounding efforts to frame a tariff bill, however, are so numerous that necessarily it cannot be foreseen whether there will be any delays encountered.

To Forestall Heavy Imports

The joint resolution mentioned has not as yet been adopted by the full committee, to say nothing of how it may fare in the House, and before the Senate Committee on Finance and the Senate or by the President. It is evident, though, that those responsible for the draft believe it will be enacted into law. Its purpose would be to forestall heavy imports before the higher rates become effective. It would be a piece of interim legislation such as was recommended by the United States Tariff Commission to Congress in 1917, or so-called noncontroversial legislation with important revenue features. It was prompted in anticipation of upset economic conditions of a world-wide character as the result of the war and is held to be altogether opportune at present. In the report made in response to a request from the Ways and Means Committee for suggestions of possible revenue legislation, the Tariff Commission urged that, independently and in advance of other tariff and revenue increases, statutory provision be made whereby duties and taxes would attach to merchandise previous to the date of the final passage of tariff and internal revenue laws. In making this recommendation, the commission designated as "the interim" the period between a time to be fixed in a revenue bill, or between the time of the report of such measure by the Ways and Means Committee of the House, and the date of the definite enactment of the measure into law. With statistical corroboration, the familiar fact was pointed out, as stated by the Tariff Commission, that where increases in customs duties and internal taxes are under consideration and probable, importations are "rushed" and withdrawals from bonded warehouses multiplied, with the manifest purpose of avoiding the anticipated new duties and taxes. The result is a loss of possible revenue to the Government, and, as business is ordinarily conducted, the consumers do not benefit by the process, since the merchandise can, and commonly is, thereafter sold at prices in which are included the increased duties of the subsequently enacted legislation. The dumping anticipated by the commission has taken place with respect to several kinds of commodities, such as agricultural products, wool and cotton.

"European countries and Canada do not neglect this available and fruitful field for revenue," says a report of the Tariff Commission. "The United States, by disregarding it, has frequently overlooked very considerable possible income which might have been collected without increasing the tax on consumption."

The report cites specific instances for various periods where potential revenue was lost through the lack of such legislation. While some of this possible revenue related to liquor in warehouses, from which source revenue no longer is available, it also covers general lines.

Will Push Tariff Bill

Whatever may be the outcome of the proposed interim legislation, it is certain that the Committee on Ways and Means proposes to have the permanent tariff act passed as quickly as possible. Chairman Fordney said that he thought it would not require more than two or three weeks to get the bill through the House after it is introduced, so that present plans are to have it acted upon by that branch of Congress either by the middle or latter part of May. It likewise is true that the Senate Finance Committee will take charge of the bill immediately after it passes the House with the idea of reporting it to and having it passed by the Senate as quickly as possible. That changes will be made by the Senate Finance Committee both in duties and administrative features is entirely to be expected, according to all precedents, but it apparently is the belief that there will not be any great differences between the House and Senate on the legislation.

Early passage of tariff legislation, as well as revenue legislation, is hoped for by the Administration because of its fixed opinion that such action is necessary. But back of this it is obvious that many members of Congress want the permanent tariff act to become effective as soon as possible in order to get rid of the emergency tariff bill, which is unpopular even among many who undoubtedly will vote for it because of what they think will be political expediency, or as a sop to the agricultural interests. This law would disappear with permanent tariff legislation and one source of strength for interim legislation would be the fact that the emergency act could hardly be passed until it would be invalidated by application of rates in the permanent law from the day the bill is introduced in the House. In fact, it is a question whether the emergency bill could be passed by May 1, when it is hoped to introduce the permanent bill in the House.

Progress made by subcommittees of the Committee on Ways and Means in framing tariff legislation is denoted by the fact that, except for minor details, the wool, lumber and cotton schedules have been completed.

The Metal Schedule

Representative John Q. Tilson, chairman of the subcommittee on metals, said that his subcommittee has been making good time and he still is of the belief that this schedule will be completed by April 15, if not earlier. A number of iron and steel men, whose names have not been given out, appeared before the subcommittee last week and are appearing before it this week. In addition representatives from the machine tool, cutlery, and clockmaking industries are sharing prominently in discussion before the subcommittee upon invitation of Representative Tilson. It is understood that an official of an important steel company in the South was among those appearing before the subcommittee last week and also a maker of ball bearings. In addition the views of well known steel manufac-

(*Continued on page* 952)

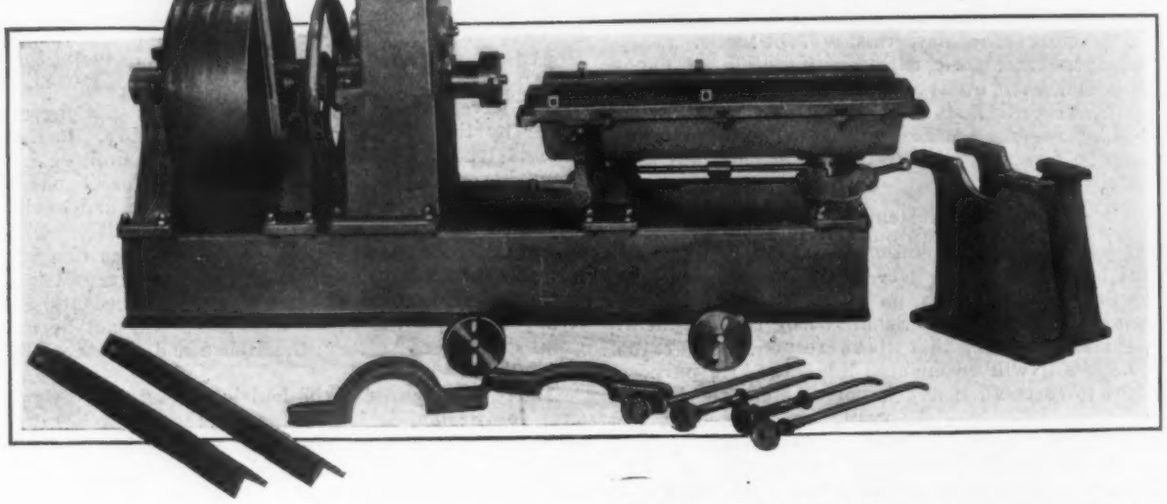
Universal Burning-in Machine

For burning in and running in the bearings of internal combustion motors the Canedy-Otto Mfg. Co., Chicago Heights, Ill., has recently brought out a new machine under the name of the C-O universal burning-in machine. An attachment is furnished for use with valve-in-the-head, V-type motors, and also for use with motors not having detachable heads. This attachment is said to be easily adjusted and to make the machine entirely universal in capacity.

The table is raised or lowered by a single control and the side panels of the table are grooved to permit the adjusting of the clamps that hold the motor. The table also serves as a sump or crank case for splash lubrication of the motor while being burned-in.

The clutch is of heavy expanding toggle type rated to deliver 75 hp. The drive is through a silent chain and sprocket and said to be noiseless so that the operator can test the timing of the motor or detect motor noises after the bearings have been run-in. Split, phosphor-bronze, bushing-type bearings are used and can be conveniently removed for repair or replacement.

Machine for Running in and Burning in the Bearings of Internal Combustion Motors



The machine requires a floor length of 90 in. and the base measurement is 79 in. Twenty horsepower is said to be sufficient to run the machine to its capacity under the severe conditions and with the largest motors.

A Modern German Foundry

A full description of the foundries of G. Krautheim, of Chemnitz, Germany, which are excellently laid out on moderen lines for steel, gray iron, and malleable iron castings, appears in *Stahl und Eisen* for Sept. 30 and Oct. 28, 1920. The article contains 22 illustrations.

Decline in Cost of Living

According to a compilation by the Youngstown Sheet & Tube Co., Youngstown, Ohio, the cost of 11 principal necessaries has declined an average of 37.8 per cent within the past 12 months. The survey was made for the benefit of the 12,500 employees of the corporation.

At a conference in Pittsburgh, March 24, between representatives of the Building Construction Employers' Association and the Bridge and Structural Iron Workers' Union the workmen were asked to accept a cut in pay of $1.25 per hr. to $1 per hr., or from $10.00 to $8.00 per day. The representatives of the union agreed to submit the proposition to the membership and to announce the result later.

BUSINESS CONDITIONS

Ex-Secretary Houston Says Survey Indicates Country Is Working Back with Caution

Results of a second survey of business conditions throughout the country have been published by the Fidelity & Deposit Co. of Maryland, more than 1000 of whose agents gathered the data from bankers, manufacturers, merchants, farmers and others.

Former Secretary of the Treasury David F. Houston prepared a commentary on the survey. He says:

"This second survey of national conditions, made by the Fidelity & Deposit Co., is suggestive, and will be helpful. At all times information of the sort here gathered is valuable. It is particularly so now when there is still uncertainty in the business world, and leaders are debating the details of their industrial programs and policies. It indicates that the business world is still feeling its way, but with increasing confidence, and with the conviction that the worst has passed.

"The country has successfully borne the strain caused by a most notable drop in prices, particularly of a vast volume of raw materials, and has weathered a trying period of liquidation. The demand for finished products has not developed to the point where our factories feel justified in taking the requisite quantity of our surplus raw materials to furnish the necessary relief to their producers; but there are some indications of a change in this direction.

"Business men realize that forced action, based on artificial optimism, may lead to unwise action, and produce further embarrassment.

"The foreign situation has not shown the expected improvement, and continued difficulties are experienced in discovering an effective European market for our commodities.

"This survey does point to certain favorable domestic conditions. The cost of living has appreciably diminished. Building operations in a number of districts tend to increase. There have recently been no strikes of consequence. Greater productivity of labor per man is reported from all districts. Raw materials are plentiful, and physical transportation conditions are good. There have been no business failures of moment. The crop outlook is satisfactory; and the banking situation has improved. It is believed that confidence in business circles is slowly spreading, and that while there is hesitancy, the business men of the country are feeling their way with sound business caution, and the country is working back toward a more stable condition."

C. S. Davis & Co., Inc., dealers in tin plate and sheet metals, have commenced the construction of a warehouse with 15,000 sq. ft. of floor space at Thirty-seventh Street, near Iron Street, Chicago. The investment, including the lot, 132 x 135 ft., will be $65,000. The company will maintain its main offices in the new building, with branch offices and warehouses in New York and Pittsburgh.

Independent Coke Operators Reduce Wages

Cut Is from 22 to 33 Per Cent in Various Grades of Labor — No Indication as to Action of the Frick Company — Production Very Low

UNIONTOWN, PA., April 5.—The independent coal and coke operators in the Fayette County field have posted or announced wage revisions, putting into effect, as of April 1, the wage scale of Nov. 10, 1917. This involves a reduction from the present H. C. Frick Coke Co. scale, put into effect Sept. 1, 1920, of 22 to 33 per cent in various grades of mine and coke plant labor.

This action, although discussed as a probability for many weeks, came as a big surprise from the fact that it represents practically all of the independents. In most of the plants not now operating, the scale of November, 1917, will be the scale of wages when operations are resumed.

Some of the leading independent operators have had the matter under consideration for several weeks. There is, it is understood, an absence of any formal agreements or any joint meetings in regard to the matter, but the series of informal conferences resulted in the decision of the independents to take the action.

The reduction does not carry the wage scale back to a pre-war basis. There were five increases during the war period prior to the Nov. 10, 1917, scale.

The scale announced by the H. C. Frick Coke Co. on April 1, 1912, continued in effect until Feb. 1, 1916. Subsequent increases by the Frick company, followed by like increases on the part of the independents, were made on May 8, 1916; Dec. 16, 1916; May 1, 1917; Oct. 1, 1917; Nov. 10, 1917; Dec. 1, 1919; April 1, 1920, and Sept. 1, 1920, the present scale now in effect at the Frick company operations. First reduction from this scale was announced by W. J. Rainey, Inc., effective on March 8, 1921, when a reduction averaging 18 per cent was put into effect without protest from the workers.

Thus there were three increases in 1917, the last, the scale of Nov. 10, 1917, again made effective as of to-day, extending for nearly 13 months, until Dec. 1, 1919. Two additional increases were announced in 1920.

There is no indication as to when a new scale will be announced by the H. C. Frick Coke Co. Many observers yesterday, in line with the action of the independent operators, believe that the Frick revision, probably putting into effect the Nov. 10, 1917, scale, will come during this month. Others are of the opinion that it may be as late as June 1 before such action is taken by the Steel Corporation, basing their opinion on the premise that the Steel Corporation will not act until there is a settlement of the controversy over the railroad wage schedules.

The effect of the general independent agreement upon the new scale is expected to go far toward stabilizing the coal and coke industry and as forming a definite basis upon which to make contracts. Inasmuch as the Steel Corporation consumes its entire output of coal and coke, practically, within its own subsidiaries, the decision of the independent operators is expected to open the way for coal and coke consumers to make contracts and to figure definitely upon their needs in the future.

It is pointed out that the Nov. 10, 1917, scale, again in effect, was established during the period in which Government prices on coal and coke were in effect, the coke price being $6. Present quotations for coke are slightly above $4.

Operations of the H. C. Frick Coke Co. the past week were the lowest in many years. Coke output is not above 20 per cent. Coal output is around 45 per cent, this feature being held up by the by-product output in the Klondike region of Fayette County which supplies the fuel for the Clairton by-product ovens.

Indianapolis Branch National Metal Trades Association

INDIANAPOLIS, April 4.—Approximately 600 persons were seated at the tables in the Riley Room of the Claypool Hotel last Thursday evening, at the fifteenth annual dinner of the Indianapolis Branch of the National Metal Trades Association. Included in these were judges of the Indiana Supreme and Appellate courts and city and State officials, guests of the members. In the absence of Charles Piez, president Link Belt Co., Chicago, Charles W. Jewett, Mayor of Indianapolis, acted as toastmaster.

Dr. Charles Aubrey Eaton, editor *Leslie's Weekly* and industrial relations expert, as the speaker of the evening, held the closest attention of the banqueters while he discussed "The Real Labor Problem." He said that American employers, by providing education and leadership for the workingman, can solve 90 per cent of the labor problem; that the employer is the normal leader of the workingman and has been neglecting his task. "Labor will follow a leader," he said. "Beat the professional deliverer to it; be your own deliverer. America knows nothing of class or caste and introduction of these cannot solve American problems."

European conditions, he said, required men to advance their class in order to advance themselves. He told of the rise of Charles M. Schwab and pointed out that this could not have happened under European conditions.

In discussing strikes, the speaker said 90 per cent of American workingmen are conservative, but sometimes they are bedeviled by groups of exploiters and are terrorized. Where there were a thousand Socialists among them during the war there is only one today. "We must teach the workingman how to invest his savings," he said; "if we can get him in the habit of going to the bank, we won't have to worry about his going to Socialist meetings."

Dr. Eaton said the passage of the Adamson law was a calamity, a "failure to stand for the fundamental principles of American life." He urged employers to be above any temptation to get even with their employees and to cultivate a "get-together attitude" with the workers, and cultivate also the spirit of Americanism and the spirit of Christ.

The address was so well received that many applications were made to A. J. Allen, secretary of the Indianapolis branch, for copies to be distributed among the employees of the members. They will be printed, he says, for free distribution among members and will be sold at cost to others.

Following the banquet, a moving picture film, "The Big Idea," was presented, a drama of industry, showing the fallacies of Socialism.

At a brief business meeting preceding the dinner, the following officers were elected: President, Stanley Whitworth, Stutz Motor Car Co.; vice-president, George O. Rockwood, Rockwood Mfg. Co.; treasurer (re-elected), L. M. Wainwright, Diamond Chain & Mfg. Co.; executive committee, Will H. Oakes, Oakes Co.; Harvey G. Shafer, Nordyke & Marmon Co.; Alfred Kauffman, Link Belt Co.; George A. Weidely, Weidely Motors Co.; O. B. Iles, International Machine Tool Co. The following members were elected eleventh district committee: R. P. Johnson, chairman, Warner Gear Co., Muncie; A. G. Seiberling, Haynes Automobile Co., Kokomo and Western Drop Forge Co, Marion; Frank

B. Ansted, Lexington Motor Corporation, Connersville; D. E. Ross, Ross Gear and Tool Co., Lafayette, and Robert H. Hassler, Robert H. Hassler, Inc., Indianapolis.

H. G. Myers, Chandler & Taylor Co., Indianapolis, who has held the presidency two years, briefly reviewed the status of the Indianapolis branch, which now has 54 members, 37 located in Indianapolis and 17 in adjacent cities, Anderson, Connersville, Columbus, Evansville, Kokomo, Lafayette, Marion and Muncie.

The seventeenth annual meeting of the Associated Employers of Indianapolis, Inc., will be held at the Masonic Temple, Indianapolis, Wednesday evening, April 13, when an address on "The Immigrant and Americanism" will be made by Hon. Frederick A. Wallis, commissioner of immigration, Ellis Island.

Falling Off at Cleveland

CLEVELAND, April 4.—Plant operations in the metal working industries in Cleveland on March 31 showed a falling off of 5.4 per cent as compared with Feb. 28, the decline being slightly greater than during the previous month. The same plants showed a reduction of 2.7 per cent on Feb. 28 as compared with Jan. 31. These figures were compiled from reports made to the Chamber of Commerce and the United States Department of Labor by 41 plants listed as iron and steel and products and includes steel plants, outside of the American Steel & Wire Co. plants, foundries and other plants in the metal working industry except automobile plants. The latter showed a gain in operations on March 31 of 24 per cent as compared with Feb. 28. On March 31 the 18 Cleveland automobile plants reporting had 8103 employees as compared with 6532 on Feb. 28.

Wire Demand Changes in Wage Agreement

Demands for material changes in the wage agreement between independent steel manufacturers allied with the Western Bar Iron Association and the Western Sheet and Tinplate Manufacturers' Association, and employees affiliated with the Amalgamated Association of Iron, Steel and Tin Workers, will likely be made by employers at the annual conference in June. The demands will center on modifications of the existing agreement which will tend to reduce production costs.

It is considered likely that manufacturers' proposals will be concentrated on the elimination of extras in the form of helpers and charges, rather than a reduction in the base rate. The manufacturers especially object to the services of helpers in certain mill operations, which they declare could be dispensed with, without inconvenience to members of the crew. They claim that the Steel Corporation does not have to contend with these extra charges in its sheet and tinplate divisions, and that conditions in its mills are equally as favorable as those of the independents. The latter interests contend that the extras in the present agreement contribute materially to the final costs and that the leading interest, which operates under an open shop policy, does not have these to pay and is in position, therefore, to produce more economically and equally as satisfactorily for the affected workmen.

Whatever suggestions in this respect are advanced by the manufacturers will be for the principal purpose of effecting reasonable economies, they state.

At the conference in June, 1920, the manufacturers and representatives of affected workers deadlocked over a clause presented by the Amalgamated Association known as the "memorandum of agreement," which employers maintained committed them to recognition of organized labor under certain conditions. The manufacturers stoutly refused to incorporate such a clause into the agreement, and it was finally withdrawn, at an adjourned meeting held at Columbus, Ohio. Demands by the workmen for higher base rates were overcome by the employers, who instead offered concessions in the way of employing helpers on various operations and granting extra charges. Manufacturers will now seek the annulment of most of these concessions.

Because of the general conditions in the trade, it is not expected that difficulty will be encountered in reaching an agreement this year.

The next bi-monthly examinations will be held about May 1, and puddlers, sheet and tinplate workers are due for another reduction. Sheet mill employees are now being paid according to a 4.30c. card, and in the meantime the price of black sheets, upon which the settlement is based, has sagged to around 4c. per lb. Tinplate is generally priced at $7 per base box, the last settlement being based upon a price of $7.15. A small reduction in wages of tin mill workers will therefore be brought about.

Has Not Changed His Mind

Charles L. Taylor, long identified with the Carnegie Steel Co., who was a member of the stockholders' committee of the United States Steel Corporation which made a report on labor conditions at the annual meeting of 1912, writing from Santa Barbara, Cal., to Paul U. Kellogg, editor of the *Survey*, in response to an inquiry, reaffirms his position as to long hours. He says:

"My judgment is still the same as recorded in the stockholders' report of April 15, 1912, to the effect—

> No matter what alleged difficulties in operation may seem to hinder the abandonment of the seven-day week they must be met.

"And further, quoting from the same report,

> that following in the wake of other betterment of conditions in the steel industry, there will naturally come a shortening of the hours of labor and the eventual abolishment of the twelve-hour day, which will tend toward increasing the efficiency and resourcefulness of the working population and for that reason bring benefit to both employer and employed.

"Personally I place great confidence and reliance upon the results which will ultimately follow Judge Gary's order issued last fall, to the effect 'that seven-day labor should, so far as possible, be eliminated from the plants of the United States Steel Corporation,' and upon the investigation being conducted by Mr. Schiller and his committee on the subject of whether a change from the two to the three shift system is possible, and if so, how and when it can be put into effect."

Willard Beahan Addresses Foremen

Three hundred foremen and department heads employed principally in the iron and steel plants of the Mahoning Valley have formed a club for promotion of their interests, which is designated the Foremen's Club. Meetings are held at stated intervals, experiences exchanged and usually a talk delivered by an authority on the subject of handling men. The club has been valuable as an educational medium.

Willard Beahan of Cleveland, engineer of equipment of the New York Central railroad, was the speaker at the last meeting held March 29. "The most difficult and at the same time the most important engineering problem at the present time is the engineering of men," he stated. "In handling laborers, and especially in times of trouble, you must have absolute right on your side, you must have authority, you must be without fear and you must act quickly," he advised.

To Vote on Building Wage Reduction

CHICAGO, April 2.—The Chicago Building Trades Council last night unanimously agreed to submit a recent proposal of the contractors' association for a 25 per cent cut in wages, to a referendum of its membership. The same proposal had been flatly rejected twice within the last 30 days. If the workmen accept the reduction, it is predicted that $100,000,000 worth of building contracts will be let in Chicago within the next month. This will provide work for 35,000 unemployed in the building crafts. If accepted by the workers, the wage cut will be effective May 1. Skilled workers will drop from $1.25 to $1 per hr. and unskilled from $1 to 70c. per hr. The reduction will affect all the building trade crafts.

Arthur G. McKee & Co., engineers and contractors, Cleveland, have received an order from the Carnegie Steel Co. covering the furnishing of a McKee revolving distributor and new gas seal for its I Furnace at the Edgar Thomson Works, Braddock, Pa.

Boring and Drilling Machine

The No. 217-H horizontal boring and drilling machine recently brought out by Baker Brothers, Toledo, Ohio, is a single purpose tool, for such operations as the machining of crank cases, large transmission cases, rear axle housings and other work of like class.

The fundamental design and construction is the same as the No. 217 Baker vertical single purpose drilling machine, including an annular ball bearing drive. Speed and feed changes are obtained by change gears, by the substitution of which a wide range of feeds and speeds may be attained. An adjustment is provided vertically to take care of any discrepancy in castings or fixtures that may be placed upon them.

A Single Purpose Tool for Machining Crank Cases, Transmission Cases, Rear Axle Housings and Other Work of Like Class

The principal specifications include: Capacity, 2 in. high speed drill in steel; height of spindle to table, 16½ in. maximum, 15⅝ in. minimum; length of table, 75 in.; length of feed, 16 in., and a No. 5 Morse taper in the spindle. The length over all is 11 ft. 4 in.; the width over all 25¼ in., and the weight 4750 lb. The width of driving belt is 4 in.

Federated Engineering Societies

Permanent headquarters of the Federated American Engineering Societies have been established in Washington, on the third floor of 719 Fifteenth Street, N. W., the National Savings & Trust Building. A lounging or conference room will be provided and the plan is to render as much personal service as possible to engineers who visit Washington. L. W. Wallace, the executive secretary, will be permanently located in Washington in the near future.

The Boston Society of Civil Engineers and the Engineering Society of Milwaukee have joined the federation.

The next meeting of the executive board is to be held in Philadelphia on April 16. The board will be the guests of the Engineers' Club of Philadelphia. A dinner at the Bellevue-Stratford Hotel on the evening of April 16 is to be addressed by the president, Secretary of Commerce Hoover.

The iron and steel plant at Monterey, Mexico, has opened up at full capacity and is turning out about 250 tons of ingots daily. It has sufficient ore on hand to keep the blast furnaces in operation until the end of June. The principal output now consists of steel rails, beams and commercial iron products. About 6000 men are regularly employed. The concern recently acquired for $250,000 the Hercules iron mines in Coahuila, one of the largest properties in Mexico, and expects this year to establish a plant at Monclova for working the new properties.

The number of persons registered with the Illinois free employment offices during the month of February showed 261.1 applicants for every 100 places open, as against 274.5 in January, 198.7 in December and 127.9 in November.

REDUCED OPERTIONS

Only Six Active Blast Furnaces in Mahoning Valley—Spotty Conditions in the Sheet Market

YOUNGSTOWN, OHIO, April 5.—Indicating the uncertain state of steel buying is the fluctuation in operating schedules of Mahoning Valley producers, which immediately reflect change in incoming tonnage. The current average is from 5 to 8 per cent below that of the week before, the decline in the general rate being accentuated by the suspension of Mattie stack at Girard, Ohio, operated by the A. M. Byers Co., Pittsburgh. Open-hearth furnace production is also declining, while sheet mill schedules show a sharp decline over the previous week. With only six active blast furnaces out of 27 in the Valley, pig iron output is at the lowest ebb in many years. The Carnegie Steel Co. is operating two furnaces at the Ohio Works; the Youngstown Sheet & Tube Co. has two in blast at its East Youngstown works, while the Republic Iron & Steel Co. and Brier Hill Steel Co. are each operating a single stack. Otherwise iron capacity of the Valley is idle.

Tinplate has taken the leadership of the steel market from tubular products and appears to be in most active demand, owing to the expanding needs of container manufacturers. Among the other products in most active demand are wire and wire products and fabricated steel. The plate makers considered an inquiry during the last few days calling for 1700 tons of plates, and issued by a boiler works interest at Sharpsville, Pa.

Disposing of Pig Iron Stocks

Though transactions are noticeable by their absence, interest continues to be centered in the pig iron market because of the accumulations of iron by steel works interests and the disposition of certain of such producers to dispose of these accumulations. One company which has been operating but a single blast furnace in order to produce gas for its by-product coke plant, and has accumulated a considerable tonnage of iron by reason of such action, denies that it has sold any of this output at less than $24.50. The tonnage involved at this price was for off-grade basic. This company admits, however, that sales have been made by other Valley interests at a lower price, involving what would ordinarily be considered a small tonnage, but of more than usual significance at the present. The aggregate of recent transactions, however, which have actually taken place, has been very small, and the reported revival in some quarters has failed to become manifest in this territory.

Independents Have More Orders

While independent makers are getting a better share of going business than a few weeks ago, evidences are

still lacking of improvement in general steel buying.

The spotty condition of the sheet market is apparent from the fact that sheet mills of the Falcon Steel Co., Youngstown Sheet & Tube Co. and Sharon Steel Hoop Co. are fully suspended this week. The Brier Hill Steel Co. is engaged working off small orders for both sheets and plates. Some of the recent plate business in the Valley is destined for Mexican consignment. It is the practice of sheet-makers to suspend mills until orders have accumulated in sufficient volume to warrant production for at least a week, when the units are started. Occasionally business is accepted at a sacrifice in order to maintain working schedules for a definite period, though this practice is not general. Black sheets are uniform at 4c., some tonnage being accepted slightly under this figure now and then because the tonnage fits in with working operations. Galvanized sheets rule around 5c., though some sales have been made from stock at 4.75c. Reported improvement in manufacturing operations of some of the leading automobile builders who buy sheets in the Mahoning Valley has not resulted in proportionately increased buying from such quarters. An improvement, however, is looked for by Valley sheet makers who supply large tonnages of such metal for automobile purposes. Sheet mill operation is at the rate of 30 per cent this week, as compared with 47 per cent the week before.

Additional tubular goods orders have been received by the Sheet & Tube Co., enabling it to operate seven of its 11 pipe furnaces, while the Republic Iron & Steel Co. has about one-third of such capacity in production.

The nominal sheet bar price continues at $38, maker's mill, with little tonnage moving, and the declaration by large consumers that this material can be purchased for $35.

Steel bars are being taken very sparingly at prices largely dependent on the nature of the specifications.

Refractories Market Is Reflection of Dullness in Iron

PITTSBURGH, April 4.—Activities in refractories still are of the most limited sort, due to the fact that the iron and steel industry, which normally consumes 90 to 95 per cent of the production of fire clay brick and refractories, to-day is not more than 30 per cent engaged and iron and steel makers have good-sized reserve stocks. The Steel Corporation subsidiaries have been curtailing production and plant operations pretty steadily during the past four or five weeks and this has been accompanied by a steady shutting off of shipments of brick against old contracts. There have been reports of several good-sized inquiries, but investigation discloses that these were nothing more than lists put out by steel companies for the purpose of securing prices for inventories. As a matter of fact, real inquiries are utterly lacking and such shipments as are being made are entirely against orders placed some time ago. It is doubtful if as much as 30 per cent of the refractories capacity of the country to-day is engaged and while one large unit is running at about 60 per cent, it is frankly admitted that practically all of the production is for stock. It is the plan of this company to make up about a month's requirements of its regular customers and then to shut down all of its plants unless, in the meantime, business improves sufficiently to warrant operation. There is no change in prices, but quotations are entirely nominal and there is no question that the appearance of inquiries of the size which have been reported to have been out, would mean more or less shading to obtain the order.

We quote per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$40.00 to $50.00	$35.00 to $40.00
Ohio	40.00 to 45.00	30.00 to 35.00
Kentucky	38.00 to 45.00	35.00 to 38.00
Illinois	40.00 to 50.00	30.00 to 40.00
Missouri	45.00 to 50.00	35.00 to 40.00
Silica Brick:		
Pennsylvania		45.00 to 50.00
Chicago		55.00
Birmingham		56.00 to 60.00
Magnesite Brick:		
Standard size, per net ton		90.00
Chrome Brick:		
Standard size, per net ton		75.00

RAIL PRODUCTION

Lead of Open Hearth Increased—More Material Rerolled

The production of rails in the United States in 1920, according to a special statistical bulletin just issued by the American Iron and Steel Institute, was 2,604,116 gross tons compared with 2,203,843 tons in 1919. Of the total production in 1920, 89.63 per cent was open hearth, compared with 85.91 per cent in 1919, while 5.49 per cent was Bessemer in 1920, compared with 9.71 per cent in 1919. The rails classified as "all other" comprised 4.88 per cent of the total in 1920, compared with 4.38 per cent in 1919.

The production of renewed and rerolled rails in 1920 was 148,170 tons, the largest tonnage since 1916, when the total was 148,686. Of the total rerolled in 1920, 21,472 tons was from new seconds, new defectives, etc., and 126,698 from old rails. The production of alloy-treated steel rails in 1920 was 12,909, compared with 6476 in 1919 and 3111 in 1918.

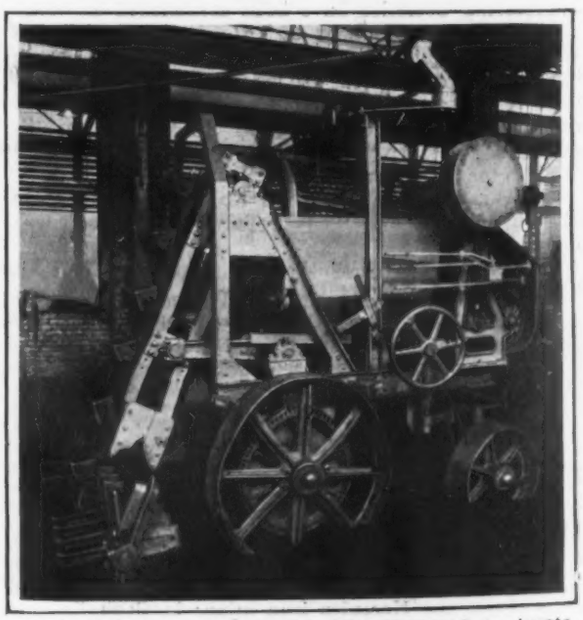
PRODUCTION OF RAILS BY WEIGHTS AND PROCESSES, 1920

Kinds	Under 50 lb.		50 to 84 lb.		85 to 99 lb.		100 lb. & over		Total	
	Gross tons	Per cent.	Gross tons	Per cent.	Gross tons	Per cent.	Gross tons	Per cent.	Gross tons	Per cent.
O. H.	337,250	68.96	363,201	83.82	907,017	95.21	726,754	99.68	2,334,222	89.63
Bess.	41,424	8.47	70,132	16.18	28,979	3.04	2,364	.32	142,899	5.49
Other	110,369	22.57	.....	.....	16,626	1.75	.....	.....	126,995	4.88
Total	489,043	100.00	433,333	100.00	952,622	100.00	729,118	100.00	2,604,116	100.00

New Sand Cutting and Screening Machine

The Whiting Corporation, Harvey, Ill., has recently completed the construction of a sand cutting and screening machine designed to aerate, screen and temper molding sand at one operation. It is now undergoing a series of foundry tests before being placed on the market.

A series of rapidly revolving blades throw the sand toward the center of the machine where it is gathered by the bucket elevator and conveyed to the revolving screen. The screen mixes the sand and removes refuse, such as gaggers, wedges, runouts, broken cores, etc.



Sand Cutting and Screening Machine Designed to Aerate, Screen and Temper Molding Sand at One Operation

The clean sand is deposited in a windrow beneath the machine ready for molder's use.

Among the features may be mentioned: Two cutting speeds selectively engaged by a jaw clutch; a steering mechanism that permits turning in narrow quarters and electric motor or gas engine operation of all movements.

CONTENTS

Heat Treating Plant at Nash Motor Works 895
Refining and Carbonizing Furnaces as Well as Compound Mixing and Conveying Equipment

Open-Hearth Furnace Waste Heat Utilization 899
Coal Saving Equivalent of Recovery from Furnace Gases—Boiler Design—Temperatures

Mannesmann Oblique-Rolled Seamless Tubes 903
Dependence Upon Obliquity of Rolls for Hollowing of Solid Ingots—Torsional Forcing of Material from Center—Relation Between Roll Taper and Hollowing

Foundry Pig Iron in Birmingham District 907
Trend Toward Use of Machine Cast Pig—Advantages Over Sand Cast Iron

Season-Cracking of Brass and Other Alloys 913
British Institute of Metals on Cracking of Cold Drawn Material—Changes in Aluminum Sheets on Heating

Quick Action on Tariff Is Planned 919
Proposed Joint Resolution Would Make Law Effective from Date of Introduction—Steel Manufacturers Heard

March Pig Iron Production 930
Daily Output Off Over 25 Per Cent from February and Less Than Half That of a Year Ago

Italian Steel Trade Depressed But Hopeful 932
Sharp Competition from Belgium and Germany—Possibilities of Scrap Trade with United States—New Construction

Organizing Advisory Trade Committees.. 898
Industrial Cost Association..... 898
Stoker Manufacturers' Meeting..... 898
Southern Ohio Iron and Coke Association. 900
Plant Use of Motion Pictures..... 900
Drop Forge Meeting..... 900
Air-Cooled Slag Pockets..... 901
Measuring Furnace Gas..... 902
Desulphurizing Coke 906
Employment in New York Factories..... 906
Mesabi Sinter 909
Investigating Freight Rates..... 910
Progress in Tariff Revision..... 910
Twenty Years of Steel Corporation..... 911
Nut Facing Fixture for Drilling Machines 911
Cutting Up German Guns..... 912
Work on Testing Codes..... 915
Industrial Film Service..... 915
Pressure-Operated Switch 916
Use of Steel in Umbrellas..... 916
British Steel Exports and Imports..... 916
Counterbore of New Design..... 916
Welder for High Speed Drills..... 917
Protection in England..... 917
Structural Steel Relatively Low..... 917
Oscillating Surface Grinder..... 917
Shear Blade and Face Grinder..... 918
Production and Cost Problems..... 918
Loss in Elevator Designs..... 918
Exports from San Francisco..... 918
Universal Burning-in Machine..... 920
Business Conditions Surveyed..... 920
Wage Reductions 921
Metal Trades Indianapolis Meeting..... 921
Labor Notes 922, 929
Horizontal Boring Machine..... 923
Federated Engineering Societies..... 923
Refractories Market 924
Rail Production 924
Sand Cutting Machine..... 925
Editorials 926
Return of Activity—Steel Corporation Capitalization—Parallel of Copper—Immigration Problems
Foreign Market Conditions.....928-929
Franco-Italian Agreement 934
Steel for Japan..... 934
German Export and Domestic Iron and Steel Prices 935
Industrial Finance 953
Trade Items 953

Iron and Steel Markets 936
Comparison of Prices 937
Prices Finished Iron and Steel, f.o.b. Pittsburgh 948
Non-Ferrous Metal Markets 949
Personal Notes 950
Obituary Notes 951
Machinery Markets and News of the Works 955
New York Jobbers' Prices 964

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York, H. M. Swetland, *Pres.*, Charles G. Phillips, *Vice-Pres.*, A. C. Pearson, *Treas.*, F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Cincinnati: Mercantile Library Building. Washington: 816 Fifteenth Street, N. W. San Francisco: 320 Market Street. London, England: 11 Haymarket, S.W. 1.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 50 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879

The Return of Activity

To identify signs of returning business activity it is necessary to define precisely what constitutes activity. It is well established that as industrial affairs are aligned in the United States there is full activity only when material progress is being made, only when the people in addition to supplying their current requirements are adding to their material resources. The total of productive capacity is much beyond that needed for fully supplying daily needs, for furnishing food and clothing, repairing existing buildings, keeping up factories and power plants and so on.

The common saying is that there must be investment of capital, but that is a misleading expression, since it suggests that capital has a definite existence, the difference from one time to another being simply as to the channel in which capital seeks investment. As a matter of fact there is much investment the capital for which is provided by credit.

For a condition of full activity two things are necessary. The people must be supplying their natural every-day requirements comfortably, and there must be investment. Either of these may occur without the other. There may be so much unemployment that the people at large have not normal buying power and cannot supply their natural requirements fully; while commodity prices and wage rates may be so low that investors take hold, and thus there may be investment without full employment and activity. Such a condition has sometimes existed to an extent, but this is exceptional.

When unemployment develops the buying power is reduced and that in turn produces more unemployment, the descending spiral continuing until something occurs to force a change. Usually this change comes by investment beginning in a small way, the investor having no very great confidence in the earning capacity of his investment in the near future, but having great confidence in the lowness of commodity prices and wage rates. As the investor's money is spent the buying power of the general public is increased. There is better employment and more spending, and confidence in the future grows.

For the turn to be rounded, the investor must be satisfied as to construction costs and must have capital, which in most cases means credit. When, as at present, men are looking for commodity prices and wage rates to decline farther, the investor is not satisfied. The outlook must be the other way. As to credit, it must be recognized that the general situation, by reason of the existence of the Federal Reserve system, is different from that which has existed at any time in the past when the question arose whether we were going to have good times or bad times. The object of the new system was and is to reduce the matter of credit to an exact science. Broadly speaking, the quantity of credit is indicated by the Federal Reserve ratio. The Federal Reserve Board will consider the matter of permitting credit expansion after the ratio has reached a certain point, from which it is still some distance away. Meanwhile the volume of credit is being reduced by liquidation of credits against stocks of commodities. Eventually much credit now used to carry merchandise will be replaced by credit used to finance construction work. The conversion on any considerable scale has not yet begun, because the ratio is not yet at the proper point.

When there is the investment of capital in construction work, together with a reasonably full buying power on the part of the general public, resulting from employment being quite general, there will be reasonably full activity. Because of the nature of these two things, the condition cannot come suddenly. Some may argue that the past has shown instances of activity and prosperity coming suddenly, as in the "boom" of 1899, but that is not true. A buying power had previously been developed through hard work. As to 1899, for instance, there had been fairly full employment in 1897 and 1898. The iron industry testified to that, for in 1897 all pig iron production records were broken, and 1898 in turn broke the record of 1897. There was much employment in producing that iron and in consuming it, for there is no question that all the iron then made was put immediately into use.

Others might argue that during the greater part of each of the past two years there was great activity, yet without much construction. To that suggestion the reply can be that there was not real activity in work and results, the activity be-

ing in drawing pay for very indifferent work or receiving fancy prices for commodities, some of them of quite indifferent quality.

Steel Corporation Capitalization

The United States Steel Corporation rounded out 20 years of its existence at the beginning of this month, having started in business April 1, 1901. The first report, for nine months of 1901, was more or less preliminary in character. A convenient comparison is made between the balance sheets at the end of 1902 and 1920 respectively, covering an interval of 18 years. The small increase in capital obligations in this period is remarkable, only $67,000,000. During that time the Steel Corporation very greatly increased its capacity and resources.

In round figures, the capital obligations outstanding at the end of 1902 comprised $508,000,000 of common stock, $510,000,000 of preferred stock, $216,000 of capital stock of subsidiary companies not held, $301,000,000 of corporation first mortgage bonds, $60,000,000 of subsidiary company bonds and $10,000,000 in mortgages and purchase money obligations, making a total of about $1,388,000,000.

The common stock issue is unchanged. The preferred stock issue has been reduced from $510,000,000 to $360,000,000, by conversion of part into second mortgage bonds, of which $174,000,000 is outstanding. The subsidiary company bonds have increased from $60,000,000 to $156,000,000, some of the old bonds having been retired while others have been issued to cover capital expenditures. The $10,000,000 of mortgages and purchase money obligations has been practically wiped out.

Present capital obligations outstanding are in round figures $508,000,000 of common stock, $360,000,000 of preferred stock, $224,000,000 of first mortgage bonds, $174,00,000 of second mortgage bonds, $156,000,000 of subsidiary company bonds and $31,000,000 of non-interest bearing notes substituted for mining royalty obligations, with two small items, bringing the total up to $1,455,000,000, or $67,000,000 more than the capital obligations 18 years earlier.

It would be impossible to make any estimate as to the amount by which the value of the Steel Corporation's properties has increased since the corporation was formed, but the increase has been very large. The operation started as one of "squeezing out the water," for at the outset the corporation was admittedly heavily capitalized, and after the water was squeezed out the operation of adding to property values without increasing capitalization was continued.

All the figures referring to the Steel Corporation are large, so large that the proportions are difficult to grasp. Perhaps one method of viewing the capitalization is to consider it in unit terms of capacity. Thus, if there were a company of just one one-hundredth the size, equally integrated and provided proportionately with all facilities, it would have an ingot capacity of about 225,000 tons a year and a corresponding capitalization of about $14,500,000. To continue the proportion, it would have $20,000,000 invested in property account and an undivided surplus of $5,200,000.

The Parallel of Copper

The American copper industry is passing through the most serious depression in its history. A crisis in a long period of waiting for a revival in demand came suddenly last week. For several months prices have been at or below prewar levels. Heavy surplus stocks, which hung over the market, had been partly financed for export trade. Production, which was greatly expanded at Government behest during the war, had been severely curtailed in recent months. Capacity was recognized as far beyond present or prewar demand. The result was the announcement last week of the closing of mines of five large copper producing companies, bringing the total of producers which have thus closed down to ten, and creating a situation altogether without parallel. Low prices have not been an incentive to domestic buying and conditions in Europe do not favor the purchase of the large amount of copper sorely needed. Yet in the face of this situation exports in 1920 were large compared with prewar purchases—if a reasonable allowance is made for the abnormal buying of Germany just previous to the war—and the 1920 exports were 20 per cent more than those of 1919.

With the steel industry now operating at less than one-third capacity, there has been a call from various quarters for a reduction of prices to much lower levels. The experience with copper supports the contention that low prices alone will not stimulate buying, and the recent course of the steel market itself gives like testimony, even though it be undisputed that only by deflation in all lines can an end be made of the buyers' strike. Similarly, extreme low prices for tin, lead and zinc have not produced active buying of these metals, and the output of lead and zinc has been drastically curtailed. In steel and iron there are not large surplus stocks in producers' hands, as in copper, but producing capacity, as with copper, is much larger than before the war. The two industries have not always had parallel experiences in price movements, but to-day both face the problems of such a throttling of capacity as they have never known.

In its much greater dependence on foreign demand copper apparently has a less promising outlook than steel. Its recovery is dependent, from the domestic standpoint, upon the availability of credit for electrical development on an important scale—an expansion which may prove to be one of the chief features of the next forward movement. The steel trade, deriving its prosperity so largely from sources at home, is likely to lead the way for copper, when real activity comes again, even though copper may reap the advantage of occasional sharp rebounds from the most thorough suppression of output ever known.

The serious position of Great Britain industrially is reflected in the present state of its foreign trade. Its people have bought their food

and cotton and wool largely with the sale of their steel and iron and coal. February foreign trade statistics show that while iron and steel importations were virtually equal to the pre-war rate, exports of these products were only 40 per cent of what they were in 1913, as analyzed on other pages. Exports and production have fallen to abnormally low levels, while buying of foreign steel is heavy. In coal, the situation is equally bad. Exports in February were less than one-third of those for February, 1913, and two-thirds of the movement in February, 1920. The miners' strike, more bitter than that of last year, is an added menace in an already serious situation, and will greatly hamper the British iron and steel trades both at home and abroad. But British industry, like the British army, comes out from every reverse more dogged than ever and even a situation as desperate as to-day's is no basis for predictions of a radical change in the British position in foreign trade.

The Immigration Problem

When Congress assembles next Monday it will be confronted by the Dillingham immigration bill, which was given a "pocket veto" by President Wilson in the closing hours of the last session of Congress. The veto of this measure was urged by the Inter-Racial Council in a brief submitted to the President on March 1, and the reasons then presented are now being urged in opposition to the re-passing of the bill.

The principal arguments used by the opponents of the bill are: That it would close this country as an asylum for immigrants; cause much hardship to families who would be prevented from reuniting and thus increase the return of foreign-born citizens; discriminate against some nationalities, and possibly create international misunderstandings.

Friends of the bill, while admitting there may be ground for some of the reasons advanced against it, insist that it is imperative that this bill, or something very much like it, be passed to prevent a tremendous movement of undesirable foreigners to this country.

Fortunately it has been demonstrated that if there is danger of this country being overpopulated by millions fleeing from distressing conditions in the old country, that danger is not imminent. It is estimated that the present transatlantic shipping facilities will permit an annual maximum capacity of 800,000 third-class passengers, and as the annual pre-war immigration averaged 738,000 it does not seem probable that there can be any alarming inflow before the immigration question is thoroughly considered in the light of all the developments that have taken place since the great war. The tariff, tax revision, the peace treaty, and other subjects of the greatest importance will demand the attention of Congress, and it would be well for the House and Senate to move slowly in enacting immigration legislation.

Resumption of the publication of German export statistics of iron and steel is promised for the near future. In view of the signs of German competition in the world's markets, this announcement is received with decided interest. Already some important figures have been given out. German iron and steel exports in the first half of 1920 were 735,446 metric tons, or 122,500 tons per month. There were 215,183 tons of bars and shapes and 102,509 tons of plates and sheets. In the first half of 1914 Germany's steel exports were 3,352,044 tons. In 1919 the monthly rate was only 10,300 tons. The 1920 recovery to July 1 was therefore nearly twelvefold that of the previous year. Machinery exports during the first half of last year were 158,359 tons, against 278,058 tons in 1914, a relatively larger recovery than in steel. The average of 122,500 tons per month a year ago compares with about 480,000 tons per month in 1913. The rate to-day is problematical, but the recovery probably has increased.

British Iron and Steel Market

Coal Strike Threatens to Close Steel Works—Foreign Inquiry More Active

(By Cable)

LONDON, ENGLAND, April 4.

Due to the coal strike the position is critical, owing to the possibility of sympathetic action by other workers. As many of the "safety men" have been called out, some pits are already flooded and others are in danger. It is impossible to over-estimate the seriousness of the situation to industry.

Iron and steel works on all sides are expected to have to close this week. The pig iron position was critical anyhow, owing to keen competition from foreign sources. Foreign ore is now stagnant, sellers of Bilbao Rubio quoting 37½s. ($7.31) ex-ship Tees (nominal).

There is more inquiry for finished steel, especially from the Far East, and some orders have been placed; but the expected improvement is now retarded by the action of the colliers, and steel works are closing. Prices are unchanged. Belgium is offering bars at £8 15s. ($34.13) f.o.b.

Markets for tin plate are strong, in spite of the coal position, and there is good demand for stock plates and wasters. Sellers quoting on 28 x 20 in. are asking 37s. ($7.22) f.o.b. Japan is inquiring for a good quantity through American sources. Galvanized sheets are weak.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.90 per £1 as follows:

Midland coke	£2 14½		$10.63
Cleveland basic	6 15 to £7 0*		26.33 to $27.30
Cleveland No. 1 foundry	7 15 to 8 0*		30.23 to 31.20
Cleveland No. 3 foundry	7 10 to 7 15*		29.25 to 30.23
Cleveland No. 4 foundry	7 9 to 7 14*		29.06 to 30.03
Cleveland No. 4 forge	7 7½ to 7 12½		28.76 to 29.74
East Coast mixed	9 0		35.10
East Coast hematite	12 0		46.80
West Coast hematite	12 0		46.80
Ferromanganese	19 0 to 20 0		74.10 to 78.00
Ship plates	18 0 to 19 0		70.20 to 74.10
Boiler plates	24 0 to 25 0		93.60 to 97.50
Tees	17 0 to 18 10		66.30 to 72.15
Channels	16 5 to 17 15		63.38 to 69.23
Beams	16 0 to 17 10		62.40 to 68.25
Round bars, ¾ to 3 in.	16 10 to 18 0		64.35 to 70.20
Rails, 60 lb. and up	18 0 to 21 0		70.20 to 81.90
Billets	13 10 to 14 10		52.65 to 56.55
Sheet and tin plate bars, Welsh	14 0 to 14 10		54.60 to 56.55
Galvanized sheets, 24 g.	23 0 to 24 0		89.70 to 93.60
Black sheets	21 0 to 22 0		81.90 to 85.80
Tin plate base box	1 6 to 1 11		5.07 to 6.05
Steel hoops	20 0		78.00

*Export price.

JAPANESE PRICES REVIVE

Rail Order for Manchuria Placed With Steel Corporation—Higher Atlantic Freights

NEW YORK, April 4.—The 60 miles of 100-lb. rails, totaling 9000 or 10,000 tons, for the South Manchurian Railroad, was divided equally between Suzuki & Co., 220 Broadway, New York, and the Mitsubishi Shoji Kaisha, 120 Broadway, New York, each exporter receiving one-half of the order. Both companies have placed their orders with the United States Steel Products Co. Another large export house dealing with Japan recently booked an order for about 300 small freight cars.

The rush of inquiries for light gage black sheets from Japan, to supply galvanizing plants in the southern part of the country which were established during the war, was evidently caused partly by a rise in prices of iron and steel during the past few weeks. These brought galvanized sheets from the low level of 300 yen ($144.75) per ton on Feb. 9, to 370 yen ($178.50) per ton on March 25. No. 28 gage black sheets, during this time, have increased from 180 yen ($86.85) per ton to 200 yen ($96.50) per ton; steel bars from 90 yen ($43.42) to 104 yen ($50.18) per ton; shapes from 120 yen ($57.90) per ton to 150 yen ($72.38) per ton; ship plates from 75 yen ($36.18) per ton to 95 yen ($45.84); tin plate from 13 yen ($6.27) per 100-lb. box to 14 yen ($6.75); No. 8 gage wire from 140 yen ($67.55) per ton to 155 yen ($74.78), and nails from 12 yen ($5.81) per keg to 14 yen ($6.75). Pig iron, however, which has steadily declined since the latter part of 1920, has reached 65 yen per ton against 70 yen on Feb. 9.

The new tariff laws have been passed by the lower house of the Imperial Japanese Diet, and a 15 per cent ad valorem tax will probably prevail on iron and steel of all kinds with the exception of pig iron, which would remain under the old duty of about 1 yen per ton. The new law will increase duties paid on iron and steel about $5 per ton over the old rate.

Much Higher Rates to French Ports

Action of the French shipping lines in re-entering the shipping conference from which they withdrew last June, precipitating a rate war, marks the close of the period of low freights and an increase of 100 per cent to 150 per cent in rates to European ports. The rates to French ports on iron and steel and other commodities have increased from about $4 per ton, nominal, to $8 per ton on less than 125 cu. ft. and $12 per ton over 125 cu. ft. While this marks an increase of 100 per cent and more to French ports, the rates to the United Kingdom are only slightly increased over rates recently prevailing. A $12 per ton rate was recently dropped to $8 and the rate has now been increased to $13 per ton on iron and steel. Rates to German ports, such as Bremen and Hamburg, are about 10 per cent higher than to Antwerp and Rotterdam.

According to an exporter recently returned from a short trip to England, Belgium, France, Germany and Holland, Belgium is the most prosperous and active industrially of all the continental countries. He points out that German light rails could be put down in New York at $45 per ton, which, however, is not sufficiently lower than the present domestic quotation to make such a shipment pay. The action of the Allies in occupying additional German territory, he says, may have a great effect in killing German competition in foreign markets for some time, as the Allied troops are now occupying the coal mining territory of Germany and collecting duty on coal shipments.

Railroad Equipment for Spain

WASHINGTON, April 5.—Commercial Attache Cunningham of Madrid, Spain, cables that bids are to be opened April 25 for 34 passenger, four baggage and 94 freight cars of various types for the Betanzos Ferrole Railroad. On the same date, bids will be opened for 2750 tons of steel rails and a large quantity of plates, clamps, switches and other equipment for the Madrid Municipal Railroad.

LABOR PROBLEMS

No Serious Trouble Among Coke Workers Expected—Carnegie Office Forces Reduced

PITTSBURGH, April 5.—Restoration of the Nov. 10, 1917, wage scale by practically all of the Connellsville district coal and coke operators effective April 1, contrary to some reports, is not being readily accepted by the workmen, and reports are current here that several coal operators and coking plants are idle because of the refusal of the men to go to work at the reduced scale. Operators, however, expect no serious trouble because there has been so much idleness in the region during the past few months that it is believed the men will prefer to work for less money than to be getting nothing.

Several conferences recently have been held between officials of the Pennsylvania Railroad and representatives of the various classes of employees of the system, with the idea of arriving at an amicable adjustment of wages.

Yesterday a conference was held between the officials and representatives of the shop employees and a portion of the latter expressed a willingness to abide by any action taken by the management in the matter of wages. Generally, however, the conferences have resulted in the rejection of the proposed wage revisions by representatives of the employees and the matter referred to the Railway Labor Board.

A conference for the purpose of getting the men to accept a cut in wages also was held recently between officials of the Pittsburgh & Lake Erie Railroad, a subsidiary of the New York Central Lines, and the representatives of the workmen, but the men refused to accept the cut and the matter will go to the Railway Labor Board. The Carnegie Steel Co., the largest unit of the Steel Corporation, has begun to retrench in the matter of office employees. Already the company has let out large numbers and those retained are being asked to take a month's vacation without pay. It is probable that the office forces of other subsidiaries will be materially reduced before long, but to date there has been no intimation of what the corporation proposes to do in the matter of wages at its several plants. It is becoming evident, however, that a revision of selling prices is not far off, as a report that some of the sales forces were urging customers to postpone purchases for a time is not denied. The common belief is that if the corporation cuts selling prices it will also cut wages.

Easton Structural Steel Co. Formed

The Easton Structural Steel Co. has incorporated under the laws of New Jersey with a capital stock of $100,000. It is a closed corporation, the stock being held by N. P. Winters, president, formerly sales manager of the Weatherly Steel Co.; Thomas Sales, vice-president and general manager, formerly shop superintendent of the Weatherly Steel Co., and David Weiss, secretary, and Arthur B. Leffler, treasurer. The company has acquired a site about three miles from Easton, Pa., where it will erect a plant for the fabrication of steel to be ready for operation about June 1. General sales offices will be maintained at 51 East Forty-second Street, New York.

The Iron Age and Its Readers

How essential THE IRON AGE is to many of its readers was indicated a few days ago in a request from a subscriber in Brazil cabling us a change in his mailing address to Brussels, Belgium, so that he would not miss a single issue.

One of the most recent appreciative communications describes our group method of indexing the advertising pages as "bringing forth a new era of efficiency in the publishing world. Every reader of the technical press will, I am positive, readily recognize this valuable added feature of THE IRON AGE."

VERY LOW IRON OUTPUT

March Daily Rate 17,719 Tons Less Than in February

Net Loss of 50 Furnaces—Production Lowest Since 1914

The blowing out or banking of blast furnaces during March has been so extensive that the month's output reached the lowest figures since the latter part of 1914 when war was declared. It was over 50 per cent less than the March output a year ago, and compared with February, the previous month, the decline in the total output was 341,735 tons or 17,719 tons a day. The net loss in furnaces blown out or banked was 50, bringing the total net loss for the last six months to 217.

The production of coke and anthracite furnaces in March, a 31-day month, amounted to 1,595,522 tons, or an average of 51,468 tons per day as compared with 1,937,257 tons, or an average of 69,187 tons per day in February, a 28-day month, and with 3,375,907 tons, or 108,900 tons a day in March a year ago, a 31-day month. There was a net loss of 50 furnaces, the total in blast on April 1 having been 102 as compared with 152 on March 1 and 201 on Jan. 1. There were 54 furnaces blown out or banked and four blown in during March.

The March decline is emphasized by the corresponding figures in November and December, 1914, when the country's pig iron producing capacity was much less. The daily output in November and December in that year was 50,611 tons and 48,896 tons respectively.

The ferromanganese production last month was 20,401 tons as compared with 17,447 tons in February and 19,686 tons in January. A feature was the production of spiegeleisen which, last month, was 20,893 tons as compared with 11,566 tons in February and only 3542 tons in January.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from March, 1920, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

1920	Steel Works	Merchant	Total
March	80,021	28,879	108,900
April	65,168	26,159	91,327
May	68,668	27,644	96,312
June	73,659	27,792	101,451
July	71,954	26,983	98,937
August	72,740	28,789	101,529
September	74,908	29,402	104,310
October	77,214	28,998	106,212
November	71,669	26,161	97,830
December	66,037	20,185	87,222
January, 1921	62,327	15,618	77,945
February	58,060	11,127	69,187
March	42,691	8,777	51,468

The figures for daily average production, beginning with January, 1915, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1915—Gross Tons

	1915	1916	1917	1918	1919	1920	1921
Jan.	51,659	102,746	101,643	77,799	106,525	97,264	77,945
Feb.	59,813	106,456	94,478	82,835	105,006	102,720	69,187
Mar.	66,575	107,667	104,882	103,648	99,685	108,900	51,468
Apr.	70,550	107,592	111,165	109,607	82,607	91,327	.....
May	73,015	108,422	110,238	111,175	68,002	96,312	.....
June	79,361	107,053	109,002	110,793	70,495	101,451	.....
July	82,691	104,017	107,820	110,354	78,340	98,931	.....
Aug.	89,666	103,346	104,772	109,341	88,496	101,529	.....
Sept.	95,085	106,745	104,465	113,942	82,932	104,310	.....
Oct.	100,822	113,189	106,550	112,482	60,115	106,212	.....
Nov.	101,244	110,394	106,859	111,802	79,745	97,830	.....
Dec.	103,333	102,537	92,997	110,762	84,944	87,222	.....

Among the furnaces blown in were the following:

One Buffalo furnace in the Buffalo district and the Oxford furnace of the Empire Steel & Iron Co. in New Jersey; one Bethlehem furnace of the Bethlehem Steel Co. in the Lehigh Valley and one Woodward furnace of the Woodward Iron Co. in Alabama.

Among the furnaces blown out or banked were the following:

Furnaces Nos. 4, 6 and 8 of the Lackawanna Steel Co., one furnace of the Donner Steel Co. and Susquehanna furnaces Nos. 2 and 4 in the Buffalo district; one Crane furnace of the Empire Steel & Iron Co. and one Palmerton furnace of the New Jersey Zinc Co. in the Lehigh Valley; three furnaces of the American Steel & Wire Co., Carrie furnaces Nos. 2 and 3, Clairton furnaces Nos. 2 and 3, Duquesne furnaces Nos. 2 and 4 and Edgar Thomson furnaces D and H and the Neville Island furnace of the Carnegie Steel Co. in the Pittsburgh district; No. 1 Newcastle furnace and No. 3 Farrell furnace of the Carnegie Steel Co. as well as Ella furnace in the Shenango Valley; two Johnstown furnaces of the Cambria Steel Co. in western Pennsylvania; the Alleghany furnace of the Alleghany Ore & Iron Co. and one Low Moor in Virginia; Bellaire furnaces Nos. 1 and 2 and Mingo furnaces Nos. 2, 3 and 4 of the Carnegie Steel Co. and the two furnaces of the National Tube Co. in the Wheeling district; Ohio furnaces Nos. 1, 3 and 4 of the Carnegie Steel Co. in the Mahoning Valley; No. 1 furnace of the National Tube Co. and one Central furnace of the American Steel & Wire Co. in northern Ohio; the Marting furnace of the Marting Iron & Steel Co. in southern Ohio; South Chicago (new) furnaces Nos. 2 and E and South Chicago (old) Nos. 9 and 10 of the Illinois Steel Co., and one Iroquois furnace in Illinois; Gary furnace No. 6 in Indiana and Bay View furnace No. 2 in Wisconsin; one furnace of the Minnesota Steel Co. in Minnesota and the Missouri furnace in Missouri; No. 1 Ensley and the Alice furnace of the Tennessee Coal, Iron & Railroad Co., Alabama City of the Gulf States Steel Co. and one Pioneer furnace in Alabama, and the Rockdale furnace in Tennessee.

Coke and Anthracite Furnaces in Blast

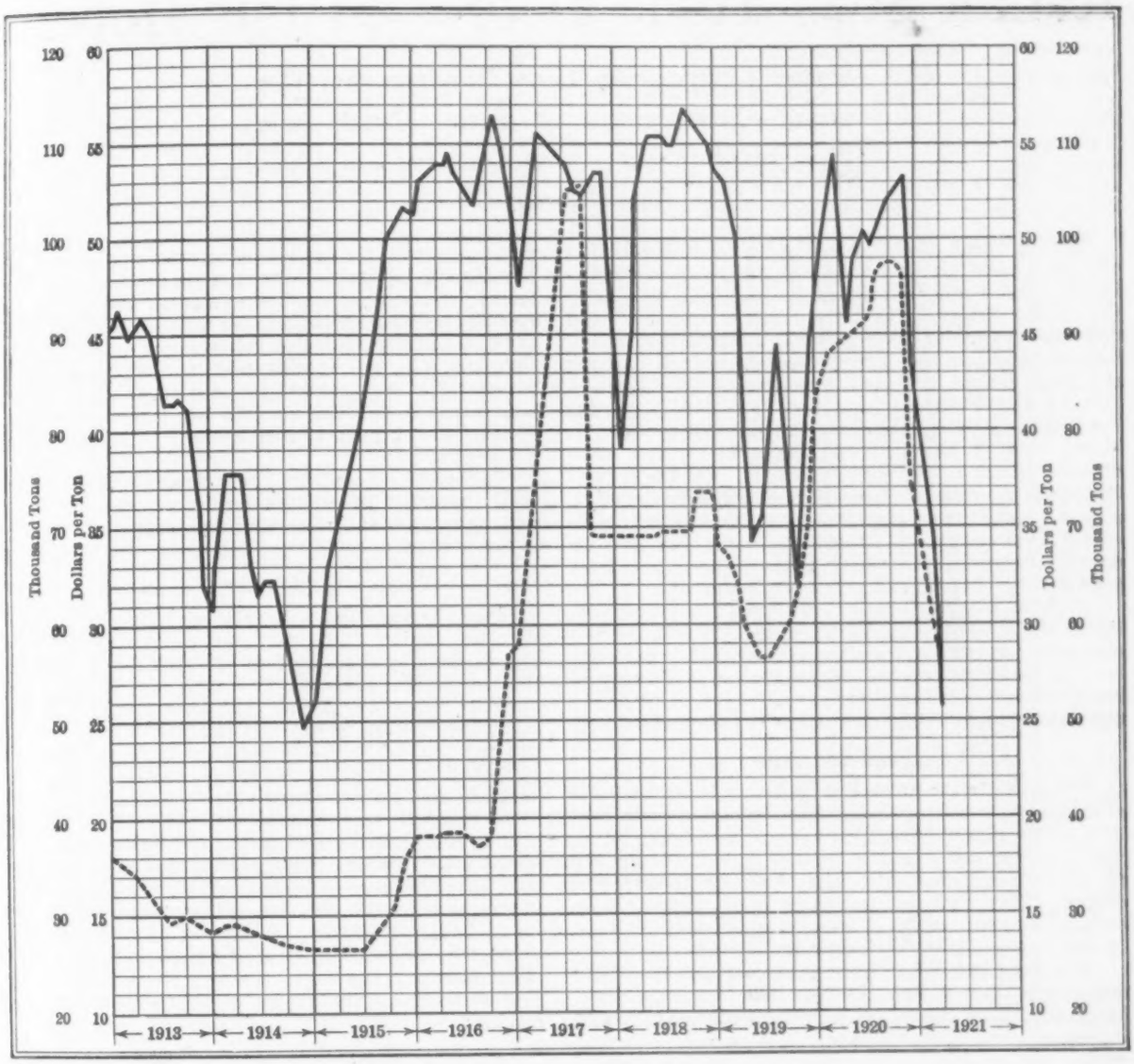
Location of Furnaces	Total Stacks	April 1 — In Blast	April 1 — Capacity per Day	March 1 — In Blast	March 1 — Capacity per Day
New York:					
Buffalo	22	2	825	7	3,135
Other New York	4	2	370	2	350
New Jersey	4	2	300	1	135
Pennsylvania:					
Lehigh Valley	18	4	1,515	4	1,500
Spiegel	2	0	..	1	90
Schuylkill Valley	15	3	925	3	945
Lower Susquehanna	10	2	625	2	790
Ferro	0	0	..	0	..
Lebanon Valley	8	0	..	0	..
Ferro	2	2	165	2	170
Pittsburgh District	55	20	12,050	32	15,300
Ferro and spiegel	4	4	935	4	700
Shenango Valley	19	3	990	6	2,000
Western Penn.	26	7	2,170	9	3,200
Ferro and spiegel	0	0	..	0	..
Maryland	6	1	435	1	430
Wheeling District	15	0	..	7	2,980
Ohio:					
Mahoning Valley	27	8	3,800	11	5,290
Central and North.	26	7	3,560	9	4,665
Southern	16	1	100	2	435
Illinois and Indiana	41	17	9,150	24	12,800
Ferro	1	1	125	0	..
Mich., Wis. and Minn.	11	3	1,665	5	1,900
Col., Mo. and Wash.	7	2	560	3	785
The South:					
Virginia	16	1	130	3	395
Kentucky	7	0	..	0	..
Aalabama	40	9	3,055	12	3,635
Ferro	1	1	80	1	75
Tenn., Ga. and Texas	16	0	..	1	25
Total	419	102	43,530	152	61,730

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for March, and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	March (31 days)	Feb. (28 days)	Jan. (31 days)	Dec. (31 days)
New York	82,559	99,019	141,661	183,169
New Jersey	9,307	3,858	3,071	6,207
Lehigh Valley	48,256	45,281	62,306	78,243
Schuylkill Valley	28,631	26,677	30,928	46,124
Lower Susquehanna and Lebanon Valleys	24,521	26,911	30,762	43,845
Pittsburgh district	387,966	486,669	557,350	571,378
Shenango Valley	52,516	83,064	100,795	107,933
Western Penna.	83,350	76,697	69,701	90,681
Maryland, Virginia and Kentucky	22,069	23,165	26,485	50,304
Wheeling district	54,573	93,477	123,222	136,967
Mahoning Valley	132,482	177,411	279,950	303,211
Central and Northern Ohio	137,925	166,571	247,389	283,446
Southern Ohio	4,547	12,200	27,962	39,986
Chicago district	344,675	406,222	464,875	471,455
Mich., Minn., Mo., Wis., Colo. and Wash.	80,539	81,812	99,514	128,351
Alabama	101,484	124,513	143,997	153,460
Tennessee	122	3,710	6,324	9,096
Total	1,595,522	1,937,257	2,416,292	2,703,856



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1919	1920	1921	1919	1920	1921
Jan.	2,430,022	2,232,455	1,932,159	32,787	23,957	22,228
Feb.	2,209,470	2,181,679	1,625,695	28,105	28,038	29,013
Mar.	2,277,507	2,480,668	1,323,443	26,644	35,275	42,691
Apr.	1,838,677	1,968,542	.....	17,308	27,628	.....
May	1,586,805	2,123,720	.....	14,604	33,407	.....
June	1,655,944	2,209,770	.....	14,254	34,751	.....
July	1,906,604	2,230,567	.....	14,805	36,789	.....
Aug.	2,108,566	2,254,943	.....	17,419	36,985	.....
Sept.	1,828,613	2,247,250	.....	20,631	39,546	.....
Oct.	1,295,690	2,393,644	.....	20,238	34,786	.....
Nov.	1,727,656	2,150,075	.....	19,964	26,944	.....
Dec.	1,916,249	2,047,167	.....	15,718	28,023	.....

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace at Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921
Jan.	3,150,938	2,411,763	3,302,260	3,015,181	2,416,292
Feb.	2,645,247	2,319,299	2,940,168	2,978,879	1,937,257
Mar.	3,251,352	3,213,091	3,090,243	3,375,907	1,595,522
3 mos.	9,047,537	7,944,158	9,332,671	9,369,967	5,949,071
Apr.	3,334,960	3,288,211	2,478,218	2,739,797	.....
May	3,417,340	3,446,413	2,108,056	2,985,682	.....
June	3,270,055	3,323,791	2,114,863	3,043,540	.....
July	3,342,438	3,420,988	2,428,541	3,067,043	.....
Aug.	3,247,947	3,389,585	2,743,388	3,147,402	.....
Sept.	3,133,954	3,418,270	2,487,965	3,129,323	.....
Oct.	3,303,038	3,486,941	1,863,558	3,292,597	.....
Nov.	3,205,794	3,354,074	2,392,350	2,934,908	.....
Dec.	2,882,918	3,433,617	2,633,268	2,703,855	.....
Total, yr.*	38,185,981	38,506,047	30,582,878	36,414,114	.....

*These totals do not include charcoal pig iron. The 1919 production of this iron was 327,097 tons.

A. O. Mortimer, for 10 years with the Monighan Foundry Co., Chicago, has bought the plant of the Milles Foundry Co. at 2443 West Twenty-first Place, Chicago, and will produce gray iron and semisteel castings. The Milles company has moved to a new foundry at Thirty-fifth Street and Leavitt Avenue.

Shops of the Chesapeake & Ohio Railroad at Huntington, W. Va., which had been idle since March 19, resumed operation April 1.

Italian Steel Trade Depressed but Hopeful

Sharp Competition from Belgium and Germany—Possibilities of Scrap Trade with the United States—New Construction Ahead

(Special Correspondence)

MILAN, ITALY, March 15.—Conditions in the Italian steel and metal markets are similar to those now existing in all the other European countries as well as in the United States. The labor troubles and the world financial depression have severely affected the Italian industry and business is very much depressed. Among the large plants, the blast furnaces of Ilva Bagnoli, Servola and Piombino have been completely inactive for several months, while steel works such as Savona, Voltri, Sesto S. Giovanni and Rogoredo are now operating at about 50 per cent of activity. Of the several thousands of workmen recently discharged by the mills, a good many have gone back to agriculture, while others have emigrated. Wages have not yet been reduced. However, the working hours per week have been cut down to 32 and overtime eliminated.

Still the general feeling is far from being pessimistic, as the present crisis did not come as a surprise and purchases of raw materials and coal had been withheld for several months. Thus the great process of readjustment to a firm basis has begun, with many signs that it will not be slower in Italy than elsewhere.

The Automobile Industry

The crisis in the automobile industry is not as acute as that now affecting automobile manufacturing centers in America. Orders are not coming in as fast as was the case up to a few months ago; still, the big plants in Turin are kept fairly busy by Government orders. They have still on their books a good many orders for cars whose delivery was seriously delayed by the September strikes and labor disturbances.

A great impulse has been given in Italy to regular automobile lines plying between little towns and villages, especially in the hilly regions where the building of railroads would be too expensive and not worth while. In the larger cities the first regular lines of autobuses have made their appearance during the last months.

On the other hand orders from the general public for automobiles are diminishing, in view of the heavy taxation imposed on cars by the Government, which considers automobiles a luxury.

There has been a great deal of discussion lately of the issue raised between the management of the Fiat company and its workmen, most of them belonging to the socialistic organization of the F. I. O. M. It is said that the Fiat company has booked a very large order for war material (machine guns, auto trucks, etc.) for some South American or Asiatic country. The workmen of the big Turin concern have threatened an immediate strike unless the order is refused, as their socialistic principles would not allow them to produce war material. The reply of the Fiat company was very plain, stating that owing to the lack of orders in automobiles, no other profitable work could be secured and conditions were not such as to permit of selecting the kind of work. Either the workmen would accept the order for war material, which would keep the plant running to full capacity for several months, or a great number of men would be discharged. This firm stand of the company must have decided the matter, since things are as quiet as ever in the great plant of the Turin concern.

The Italian machinery trade is not in such bad condition as the metal industry; the manufacturers of heavy machines are reported to work on 80 per cent basis, mainly for export and Government orders. On the other hand shipyards while still busy in completing last year's orders, have very discouraging prospects for the future in view of the difficult conditions of the freight trade and of the excess of boats.

While still busy on repairing the rolling stock of the state railroads, the car manufacturers are not wasting any time in trying to secure orders from abroad. Protected by the high rate of exchange, the Italian car manufacturers are bidding in Spain, Egypt and in some of the Balkan states, followed very closely by the Germans, who are fighting very strenuously to retake possession of the markets lost during the war. European needs in railroad material are large; all railroad systems need a general overhauling and the renewal of equipment.

Fair-sized orders from South America have been recently received by manufacturers of machinery for making noodles and macaroni; one large plant in Lombardy is filled up with work for many months to come.

Belgian and German Competition

Beset by very sharp German and Belgian competition, the Italian rolling mills are revising their prices almost daily in order to keep at home the few orders that are on the market. The drop in prices of rolled material since last August has been simply astonishing. Sheets were quoted last summer as high as 6000 lire per ton, while to-day they can be easily obtained at 2400 lire, and steel bars which were quoted as high as 3200 lire per ton have come down to 1300 lire. Some relief to the intolerable situation of the Italian rolling mills has come from the Government decree of Feb. 17, 1921, whereby the present import duties when paid in paper money instead of gold will be subject to a surtax of 300 per cent. Therefore, steel bars ¼ in. or less in thickness, which used to pay a duty of about 60 lire per ton, now are subject to a duty of about 250 lire.

Following are the prices quoted to-day in the steel market:

		About
Standard Bessemer pig iron.....	700 lire =	$28.00
Gas or steam coal.....	285 lire =	11.40
Open-hearth steel billets.....	1200 lire =	48.00
Steel bars (basis).....	1400 lire =	56.00
Steel plates (4 mm. and over)...	1800 lire =	72.00
Steel sheets (1 mm.).....	2400 lire =	96.00
Open-hearth wire rods, No. 5....	1600 lire =	64.00

Offers from Belgium and Germany are coming in freely, but prices are not much below those quoted by the Italian mills. It is noticed that both Germans and Belgians are granting extended credits to buyers.

No Market for American Steel

The chances for the sale of American products in Italy are absolutely nil. Aside from the fact that only business for early delivery is being placed, thus putting American products out of consideration on account of the long time required for the crossing of the ocean, there is no sign as yet that American exporters have definite plans in regard to the financing of contracts with Italian customers. The only real obstacle to a regular trade between America and Italy is the high rate of exchange, an obstacle that can be overcome only by a courageous policy of long credits. Some hopes are pinned to the information from the United States regarding the formation of a large banking concern for financing export trade, and Italian manufacturers trust this company will pay due attention to the needs of the Italian trade.

Much New Construction Ahead

Italian steel plants have to-day a capacity which can take care easily of three times the present consumption. On the other hand the requirements of the market will be enormous when buying starts again. It is figured that more than 30,000 new houses will be needed in the next two years to take care of the urgent requirements of the increased population, which will

mean roughly more than 3,000,000 tons of steel required for steel and concrete work. Large purchases of plots have been made by house building companies around the big cities and orders for the necessary steel will start to come in as soon as the market can be convinced that prices have reached the bottom.

Furthermore, the large program of reconstruction planned by the railroads, including the electrification of more than 6000 kilometers* of track, has been accomplished in very small part. The completion of the new direct line between Rome and Naples is waiting for rails which will be purchased when prices fall sufficiently. Also companies operating small railroad and trolley lines are ready to place orders for several hundred thousands of tons of steel products as soon as the necessary financing can be arranged and prices are readjusted.

Steel Company Financing

The financial situation of the big steel companies, while not exactly bright, is not as bad as might be supposed, notwithstanding the severe taxation imposed by the Government and its appropriation of war profits. No failure has been reported and obligations are being met fairly well.

It is rumored that the large concern Ilva will undergo a reorganization, the company being taken over by the Banca Commerciale Italiana and by the Credito Italiano, the capital considerably increased and the present management completely changed, while the headquarters of the company will be transferred from Rome to Milan.

As to the other important Italian concern, Ansaldo & Co., it is reported to have overcome its troubles and seems now to be on a sounder financial basis, as indicated by the higher quotation of the stocks at the Milan and Genoa stock exchanges.

Buying of American Scrap

The scrap market is as dull as ever. While the reserves of war scrap are nearly exhausted and only a comparatively small quantity is still rusting on the inaccessible peaks of the Alps, it is expected that the rush for foreign scrap will be tremendous when normal conditions are resumed. If France maintains her decree prohibiting the export of scrap steel, the bulk of the orders will have to go to America, as Germany will require all of her scrap for home consumption. The quantity of old materials which can be obtained from other Mediterranean countries is negligible and of an inferior grade. Meantime, the scanty needs of the Italian steel companies are being filled with the scrap coming from the dismantling of old ships.

The American scrap dealers should not overlook the fact that the Italian market is among the most important in Europe. The Italian steel plants are now making steel using 90 and sometimes even 95 per cent of scrap, so that it is not exaggerating to say that the yearly need of old materials will not be far from 1,500,000 to 2,000,000 tons, of which the greater part must be imported.

From the high level of 700 lire per ton reached in the spring of 1920, the price of heavy melting scrap has gone down to 350 lire, which at 4c. to the lire is equal to about $14 per ton. Should the rate of exchange go to 20 lire to the dollar or less than 20 it can be easily seen how great are the possibilities of American scrap dealers starting a vigorous trade with Italy, inasmuch as during the war the Italian mills had a good opportunity of appreciating the superior quality of American scrap.

Before the war the scrap market in Italy was practically a monopoly in the hands of German and Swiss merchants, who used to import old material from all parts of the world, paying cash for it and reselling it to the Italians against 90 and 180 day drafts. During the war three-fourths of the scrap steel needs were placed in America, but your dealers will probably lose the good opportunity to supplant German merchants in Italy unless they follow the German methods of sale.

The coal situation in Italy has never been so bright in the past five years as it is to-day. The diminished consumption due to the small operation of the steel mills, the large shipments received from Germany on account of reparations, and the sharp competition between America and England have brought prices very rapidly down to a low level. While six months ago nearly 1000 lire was paid for a ton of coal, the price is now only 300 lire. The sharp decline in fuel is due mainly to the break in ocean rates. It is reported that American coal is freely offered in Genoa at $10.50 and even at $10 per ton, while last spring it was impossible to get a cargo of American coal for less than $28 or $30.

American coal is slowly losing ground in the Italian markets, the preference being accorded to the English coal even at a slight difference of price. The reason is to be found in the very poor grades of coal which were shipped from America, the dealers not giving sufficient heed to the need of winning the market, but contenting themselves with immediate profits. Large quantities of coal are being stored at the different ports and in the yards of the Italian State Railways.

Financing Imports

Lively discussions have been raised lately in commercial circles regarding the rumor of alleged offers of materials from America and England at reduced rate of exchange. It is said that English manufacturers have offered to sell materials accepting the rate of 70 lire as the basis of exchange (the present rate is around 106 lire), while American merchants would sell steel products, calculating the dollar at the rate of 20 lire, against the present rate of 25 to 26 lire.

It is further intimated that the English and American dealers would deposit the lire obtained from the above sales with some foreign bank which would advance pounds and dollars up to 75 per cent of the value of the deposits, the final settlement being postponed until the lira has recovered its value.

It is evident, however, that the whole proposal is based on pure speculation, although it is possible that some exporters have tried it in order to get rid of stocks.

As to Government finances, it has been noticed with relief that the Italian budget is going rapidly toward readjustment and the terrific deficit of 18 billion lire during the year 1920 will be reduced this year nearly to 8 billions, thanks to the heavy tax yield, to the resumption of traffic and to remittances of money from emigrants.

Labor strikes are fewer and imports have not increased, while exports have shown better results lately. Everything indicates that Italy will be on her feet again much sooner than was expected.

*3750 miles.

Further Price Recessions in Italy

MILAN, ITALY, March 20.—Prices have gone down again this week and it is very probable that another drop will take place in a few days owing to the bettering of the Italian exchange. The following prices were quoted in Milan in lires per 100 kilos:

	Feb. 19	March 19	Cents per Lb., March 19
Copper, electrolytic	850	725	13.6
Copper sheets	1300	1200	22.5
Copper wire	1150	1050	19.7
Copper tubes	1450	1350	25.3
Brass sheets	1225	1100	20.6
Brass wire	1200	1075	20.1
Brass rods	650	620	11.6
Brass tubes	1350	1250	23.4
Zinc, pig	290	280	5.3
Zinc sheets	520	450	8.4
Lead, pig	250	225	4.2
Lead sheets and tubes	290	255	4.8
Black sheets, base, 4 mm	215	200	3.8
Galvanized sheets, No. 20	370	320	6.0
Tin plate, standard, per case	250	230	4.3

Robert S. Alter, vice-president of the American Tool Works, Co., Cincinnati, who recently returned from a month's tour of Mexico, reports that he found a decided desire on the part of the better class of Mexicans to establish and maintain cordial relations with the United States. American made tools are well known in Mexico, as well as other products, and the people of that country are not averse to increasing their business with American manufacturers provided some inclination is shown to reciprocate.

FRANCO-ITALIAN AGREEMENT

Plan by Which Materials Are to Be Furnished for Iron and Steel Industries

WASHINGTON, April 4.—Signor V. Maltese, in the semi-monthly *Supplemto Economic Il Tempo* of Rome for Feb. 15, makes some comments on the main provisions contained in the preliminary draft of an agreement under which France will furnish Italy with the stated amounts of coal, pig iron and other materials needed for the iron and steel industries. The writer also notes certain considerations that should be taken into account in the discussion of the proposed agreement from the viewpoint of the advantages Italy may obtain from its execution. The features of this pact as they have been put forward covering specific commodities are the following:

France agrees to export to Italy 100,000 tons of coal each month from the Saar and other mines, at the domestic consumer's price. The price so designated, it is pointed out, seems rather vague, inasmuch as the Italians understand that there are two prices for coal fixed by the French Government. The "equalized" price is the average of the figures paid for coal from French mines and also imported from the United States, England, Belgium and Germany. This average is the price paid for coal taken by private consumers, small factories, etc. A lower, or "political"—that is, less than the economic—price is charged for coal furnised the "big industries," metallurgical establishments, glass plants, railroads, gas works, and electric power stations. For example, the price of coke for blast furnaces was fixed at frs. 155 per ton, according to the *Journal Officiel* of Jan. 5, while other purchasers paid frs. 200 per ton. In addition to either of these basic prices, the buyer was charged also with transportation expenses from the point of production or from the point where the coke, if imported, was unloaded from a vessel or crossed the frontier by rail. For Italians to gain any considerable benefit from this arrangement for the importation of coal from France it would be necessary for the lower scale of prices as they are fixed for the "big industries" to be paid for coal imported under this agreement.

Scrap Iron and Steel

With regard to scrap iron and steel, France would assure Italy 150,000 tons during the coming year. This material would be sold at current market prices and on leaving France would be exempted from the export duty, 20 per cent, which was established by Presidential decree of last November. This amount of scrap iron and steel pledged by France may be increased by an amount equal to the weight of pig iron which the Italians will import from France at the same time.

The pig iron provision shows that Italy is bound by the agreement in its present from to import 35,000 tons of French pig iron this year and to pay for it the market price. The fact that Italy has to assume this amount of importation as something of a burden arises from the belief of Italian ironmasters that they have sufficient blast furnace capacity to meet their country's requirements in the way of pig iron; moreover, it is a stipulation that tends to divert the channels of Italy's import trade in pig iron as it existed prior to the war. A large part of the imported pig iron before 1914 came into Italy from Germany. The relative level of prices and foreign exchange rates would make it more to Italy's advantage to bring in iron from Germany than from France. Comparative prices of foreign pig iron in lire follow:

Comparative Prices

Pig Iron from:	Prices in Italian Currency (Per Ton)
France (Lorraine-Comptoir Metallurgique, Jan. 1, 1921):	
No. 3—smooth	Lire 720
No. 3—rough	Lire 630
Germany:	
Foundry for export (This price expected to be reduced)	Lire 646.80
Belgium:	
Fusing	Lire 807.50
Thomas	Lire 760
England:	
Cleveland No. 3	Lire 1,269

Comparing the foregoing quotations in pig iron with each other and keeping in mind the probability that the German price soon will be reduced, French prices range higher than German, though lower than those given for iron from England or Belgium. Accordingly, Italy is undertaking to import a minimum quantity of pig iron from France which might be obtained more cheaply from German furnaces, from the Italian standpoint, is making a distinct contribution to provide an outlet for French blast furnaces. The importation of French coal and iron products under this agreement would be handled by an Importing Consortium which would co-operate closely with the Comité de Forges in France and with the French Fuel Administration.

The writer who comments on this proposed Franco-Italian agreement fails to see where Italy will derive any particular benefit if it is adopted in its present form. With regard to coal, all producing countries are gorged with supplies; Italy, at present, seems to be under no necessity to offer special concessions in order to obtain French coal. By the importation of pig iron or further advanced stage of manufacture the Italians would, in some ways, it is contended, tend to impair the home market for their own iron and steel industry. Moreover, it is asserted that the French Comptoir Sidérurgique had decided, before this agreement was proposed, to sell iron and steel products at reduced prices in Italy—that is, to "dump" these products in order to relieve the badly overstocked French producers.

STEEL FOR JAPAN

Shipments Made from Seattle—Excitement in Alaska About Oil Development

SEATTLE, March 29.—The tendency of Japan to adopt Western civilization was seen in the extreme here this week when 9000 tons of lightning rods, steel plates and electrical machinery was loaded on the steamship Tajima, sailing from Puget Sound for Japanese ports. This cargo came through from Eastern mills by the transcontinental lines.

Seattle jobbers are working on prospects for some heavy duty machinery contracts. These prospects have compelled jobbers to add several lines that they have not been handling previously. Some logging machinery equipment is going into the woods, plans having been made by loggers to begin the season's cutting which was interrupted by the holiday shutdown and by business stagnation early in April. Approximately 75 per cent of the fir mills, that have been closed down to a small percentage, will be in operation by April 15, notwithstanding the unfavorable rail rate situation. Jobbers have made some large sales of corrugated sheets to fir mills that are reconstructing their plants.

Due to the discovery of paying oil well properties in Alaska during the past 60 days, news of which is just beginning to reach here, machinery jobbers expect to do a heavy season's business in oil-drilling machinery. Excitement in Alaska is intense, resembling in many ways the Klondike gold rush of 1897, and while there are few in this city not seasoned in the wildcat nature of this form of speculation, there seems to be much foundation for the present rush. The Government railway from Anchorage to Seward for a distance of 12 miles each side of the track is said to be staked out for oil claims. Credence is being given to the outlook by jobbers of oil-drilling machinery, many of whom are convinced that something resembling the Texas and Oklahoma rush is about to come.

Labor Conditions

The labor situation here is not conducive to any extensive demand for steel. At a conference here the Northwest Building Trades and Association of Plumbers

and Steamfitters went on record as opposed to any wage reductions on the grounds that the reduction in living costs does not justify such cuts at this time. John Coefield, of Chicago, international president of plumbers and steamfitters, is attending the session. At this session the Washington State Association of the United Association of Plumbers, Steam and Gasfitters was organized.

Employment conditions here are improving, affected by building and other spring work. An improvement is noted also in the smaller cities of the State.

The 12,000-ton freighter Katrina Luckenbach will arrive here April 10, her first voyage to this port, and will signalize her entry into the intercoastal service. A 15-day service will be maintained hereafter between Puget Sound and New York.

German Export and Domestic Iron and Steel Prices

Allowable Imports of Duty-free Metal and Steel Products from Alsace-Lorraine to Germany

(Special Correspondence)

BERLIN, GERMANY, March 17.—According to paragraph 268, section Ia, of the Versailles peace treaty, all raw materials, semi-finished and finished products of Alsace-Lorraine origin may be shipped duty-free to Germany for a period of five years dating from the day peace was concluded, provided the quantity entering Germany annually does not exceed the tonnage shipped to Germany during the years 1911, 1912 and 1913. The French Government is reserving the right to fix every year the quantity as well as the kind of goods to be exported to Germany under this clause. The tonnage of metal and steel products fixed for the year 1921 comprises the following:

Allowable Duty Free Imports in Germany from Alsace-Lorraine, Tons

Ores	3,400,000
Wrought iron, Foundry pig iron and crude steel	1,700,000
Cast iron and cast iron ware	11,600
Enameled cast iron ware	900
Malleable iron, constructions, black sheets and tinplate and products thereof	410,000
Metal wire and wire products	26,500
Structural shapes and railroad material	120,000
Steel drums and boilers	5,500
Tools and bright weapons	2,800
Axles and springs	350
Steel cables, wire nails, pins, tacks, etc	630
Wholesale and retail hardware goods	1,050
Springs as used for watches, clocks, and fine apparatus	41
Scrap iron, old material, etc	207,000
Aluminum ware	52
Copper and brass ware	1,400
Printing plates and copper rolls	230
Wire netting	87
Other copper ware and scrap metal, not including iron	550
Textile machinery	4,200
Agricultural machinery	850
Other machinery, including accessories	3,500
Electro-technical apparatus	150

In German interested circles it is contended that the tonnage of most of the listed articles greatly exceeds actual pre-war shipments and importers are urged to insist upon being shown a certificate of origin whenever dealing with such offers. It is openly asserted that many products of French origin are being imported under the guise of Alsace-Lorraine products by means of a forged mark of origin.

Domestic and Export Prices

The following table shows present inland prices as are actually paid by consumers. These prices are lower than the official prices, fixed by the Iron Federation, as will be seen by a comparison.

German Domestic Prices Per Ton

	Iron Federation	Market Prices	
Bar iron	2440 marks	2440 marks	($39.05)
Structural steel	2340 marks	2340 marks	(37.45)
Thick sheets	3000 marks	2700 marks	(43.20)
Medium sheets	3360 marks	2800 marks	(44.80)
Thin plates	3475 marks	2800 marks	(44.80)
Rolled wire	2720 marks	2300 marks	(36.80)

According to information obtained after making the foregoing compilation, quotations by Rhenish-Westphalian works for all kinds of rolled stocks are on the average 6 per cent below official inland prices. Upper Silesian mills are reported planning to follow suit.

German export prices to Holland are now quoted as follows: (Prices not fixed but subject to a control and approval by the Foreign Trade Control Bureau.)

Export Prices to Holland, Per Ton

	Middle of March		Middle of January
Bar iron	120 florins	($41.40)	130 florins
Thick sheets	135 florins	(46.60)	160 florins
Medium sheets	150 florins	(51.75)	180 florins
Thin plates	145 florins	(50.00)	180 florins
Rolled wire	120 florins	(41.40)	130 florins

French, Belgian and Luxemburg steel exporters are displaying a particularly lively activity of late in the Dutch market and German exporters are finding it hard to book orders. Foreign competitors (that is, other than German) are, for instance, quoting 110 fl. ($38) per ton for spot bar iron, while future deliveries are around 115 fl. ($39.70). Many German works decline to close deals at less than 120 fl. ($41.40), on the ground that quotations lower than 120 fl. are almost on par with inland prices!

For open-hearth steel prices are 50 marks per ton higher than listed.

Prices for drawn commercial bright wire and galvanized wire are not fixed by the Iron Federation, but by the "Wire Convention of 1916." The freight basis for both grades is Hamm. Since jobbers and mills are generally underselling official quotations, the convention has decided, willy-nilly, to make a cut in official quotations. Official prices are now as follows:

Drawn bright commercial wire, (freight basis Hamm)	2930 marks per ton	($46.90)
Galvanized commercial wire, (freight basis Hamm)	3580 marks per ton	(57.30)

Government Calls for Bids on Billets

WASHINGTON, April 5.—In line with its previously announced policy, the Ordnance Salvage Board, War Department, to quickly clean up surplus steel and other stocks, to-day sent out notices asking for bids on its entire lot of billets, aggregating 25,550 tons, bids to be received by the board at Washington up to April 29. The billets are high in carbon, ranging from 0.40 to 0.62 and are located at the following points: Neville Island Storage Depot, Pittsburgh, 11,019 tons; plant of McMyler Interstate Co., Bedford, Ohio, 9433 tons; Toledo, Ohio, Ordnance Reserve Depot, 1246 tons; plant of Curtis Mfg. Co., St. Louis, 2068 tons; plant of Cleveland Crane & Engineering Co., Wickliffe, Ohio, 1002 tons; plant of McKinney Steel Co., Cleveland, 179 tons.

La Belle Iron Works Additions Planned

PITTSBURGH, April 5.—Plans are in preparation for increasing the size of the open-hearth furnaces of La Belle Iron Works, Steubenville, Ohio, and the installation of a considerable amount of modern equipment. At a recent meeting of the board of directors of the Wheeling Steel Corporation, the parent company, a tentative appropriation was made with the understanding that it would be referred back to the board for final action after the engineers' reports are completed. Estimates of the expenditure entailed run as high as $3,000,000.

Iron and Steel Markets

BUT 102 ACTIVE FURNACES

Record Shrinkage in Pig Iron Output

Steel Corporation's Policy Unchanged—Prices Somewhat Lower

The slight change the week has brought in the rate of steel works operation has been toward contraction and the few changes in prices have been downward. Rumors have been widespread as to Steel Corporation plans for wage and price reductions, but the corporation apparently has formulated no new policy on either matter. At the same time developments in the trade indicate that definite announcement may come in the present month.

The week has seen some further gains at automobile works and the improvement in building has brought a better output in sanitary and builders' hardware lines. More municipalities are placing contracts for cast iron pipe.

However, these are eddies, and the main currents are unchanged, pending freight and wage readjustments.

The March pig iron statistics show the greatest shrinkage in output in all the months of the decline. Production to-day is the smallest on record in proportion to the country's capacity.

The March total was 1,595,522 tons for 31 days, or 51,468 tons per day, against 1,937,257 tons in the 28 days of February, or 69,187 tons per day. In the past month 54 furnaces blew out and 4 blew in, and the 102 furnaces in operation April 1 were producing at the rate of 43,530 tons per day, against an active capacity of 61,730 tons per day for 152 furnaces on March 1.

Since Oct. 1 the net loss in active furnaces has been no less than 217. To-day only 23 merchant furnaces in the entire country are in blast out of a total of 166. A formidable list of steel works furnaces went out in March, the Steel Corporation's suffering severely.

To-day pig iron production is at an annual rate of about 16,000,000 tons, whereas capacity is 46,000,000 to 47,000,000 tons. Steel production this week is around 30 per cent, the Steel Corporation's percentage being somewhat under 45.

Some independent companies have made rather more vigorous cuts in the past week to stir up business. Plates have been offered at 2c., Chicago, a tank inquiry for 5000 tons having come up, involving fabricating in transit. Merchant bars in small lots can be had at 2c., Pittsburgh, and 2.75c. has been named on hoops. It appears that $2 to $5 per ton below recent minimum prices on sheets is possible.

Also the week has developed the first open shading on steel pipe and tin plate. Altogether the market is now more favorable to the buyer than at any time since the decline started. On 8000 tons of concrete reinforcing bars for municipal work at Detroit less than 2c., Pittsburgh, has been quoted.

Some of the prices named in trade discussions of probable new market levels would mean further drastic cuts in steel works wages or for most producers operation without profit. A 20 per cent wage reduction, for example, would lower cost only $4 to $5 per ton, and a 20 per cent freight reduction about $2.50 per ton.

Including 16,500 tons for Federal Reserve Bank buildings in New York and Cleveland, about 30,000 tons of fresh structural projects are under negotiation. In addition about 15,000 tons of plate work is involved for tank construction. Awards of fabricated steel work total about 6000 tons.

The demand for sheets from the Detroit automobile manufacturers shows a marked improvement, chiefly through the release of old orders on which shipments were stopped last year.

The 10,000 tons of rails for the South Manchurian Railway went to the United States Steel Products Co., which from the beginning has taken the Manchurian rail business against vigorous foreign competition.

A 200-ton lot of Chinese pig iron was sold to a Pacific Coast melter at about $35, delivered, in competition with Alabama iron, or $5 below the delivered price of the latter, figuring on a basis of $25, Birmingham. Although in some centers, especially in the Philadelphia district, increased demand is noted, the pig iron market is weak and almost invariably where sales of any considerable size have been made concessions were granted of $1 to $2 per ton. The tendency to abandon the higher grade differentials of war times is more general in Eastern and Central Western markets.

Statistics of the production of rails in the United States last year further emphasize the predominance of open-hearth over Bessemer, the latter having shown a decrease of 33 per cent, while the former increased 23 per cent. The total production of the year, 2,604,116 tons, of which only 143,000 tons was Bessemer, was the largest since 1917.

Pittsburgh

PITTSBURGH, April 5.

Despite a further increase in the activities of the automobile industry, which has found reflection in freer specifications against unshipped tonnages and some new business in sheets and strips, it must be said that the iron and steel situation as it applies to this district on the whole is even more depressed than it has been. The fact that the first wave of price cutting was not productive of much business does not seem to have had permanent effect upon the price ideas of a number of the independent companies which, in the past week, have gone even lower than previously in an effort to stir up orders. In the reports which have been current is one that plates have been offered at 2c., Chicago, against a tank inquiry which will take about 5000 tons. Merchant steel bars can be bought in small lots at 2c., leaving open the inference that less could be done upon orders insuring a rolling schedule. A quotation of 2.75c. recently has come out on hoops, which is $1 a ton below the recent minimum. Some independent sheet makers have expressed a willingness to go $2 to $5 per ton under recent minimums and the past week also has developed what may be considered the first open shading of prices in pipe and tin plate, which hitherto have been immune from pressure to sell.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Apr. 5, 1921	Mar. 29, 1921	Mar. 8, 1921	Apr. 6, 1920
No. 2X, Philadelphia‡	*$26.26*	$27.26	$27.84	$47.05
No. 2, Valley furnace†	25.00	25.00	26.00	43.00
No. 2 Southern, Cin'ti†	29.50	29.50	29.50	43.60
No. 2, Birmingham, Ala.†	25.00	25.00	25.00	40.00
No. 2 foundry, Chicago*	*24.00*	25.00	26.00	43.00
Basic, del'd, eastern Pa	25.00	25.00	27.26	44.80
Basic, Valley furnace	23.00	23.00	25.00	42.00
Bessemer, Pittsburgh	26.96	26.96	28.96	43.40
Malleable, Chicago*	*24.00*	25.00	26.50	43.50
Malleable, Valley	25.00	25.00	26.00	43.00
Gray forge, Pittsburgh	25.96	25.96	26.96	42.40
L. S. charcoal, Chicago	38.50	38.50	38.50	56.50
Ferromanganese, Atl. port	90.00	90.00	90.00	250.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	38.00	38.00	38.50	60.00
O.-h. billets, Pittsburgh	38.00	38.00	38.50	60.00
O.-h. sheet bars, P'gh	38.00	38.00	40.00	80.00
Forging billets, base, P'gh.	*43.00*	43.50	43.50	80.00
O.-h. billets, Phila.	44.24	44.24	49.24	64.10
Wire rods, Pittsburgh	52.00	52.00	52.00	70.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	*2.35*	2.45	2.70	4.25
Iron bars, Chicago	*2.38*	2.60	2.60	3.75
Steel bars, Pittsburgh	2.00	2.00	2.00	3.75
Steel bars, New York	2.38	2.38	2.38	4.02
Tank plates, Pittsburgh	2.00	2.00	2.10	3.75
Tank plates, New York	2.38	2.38	2.48	4.02
Beams, etc., Pittsburgh	2.00	2.00	2.10	3.25
Beams, etc., New York	2.38	2.38	2.48	3.52
Skelp, grooved steel, P'gh.	*2.10*	2.25	2.35	2.75
Skelp, sheared steel, P'gh.	2.45	2.45	2.50	3.00
Steel hoops, Pittsburgh	*2.75*	2.80	2.80	4.00

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Apr. 5, 1921 Cents	Mar. 29, 1921 Cents	Mar. 8, 1921 Cents	Apr. 6, 1920 Cents
Sheets, black, No. 28, P'gh.	*3.75*	3.85	3.85	5.50
Sheets, galv., No. 28, P'gh.	*4.75*	5.00	5.00	7.00
Sheets, blue an'l'd, 9 & 10.	3.00	3.00	3.00	4.50
Wire nails, Pittsburgh	3.00	3.00	3.00	4.00
Plain wire, P'gh	3.00	3.00	3.00	3.50
Barbed wire, galv., P'gh.	3.85	3.85	3.85	4.45
Tin plate, 100-lb. box, P'gh.	$7.00	$7.00	$7.00	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$14.00	$14.00	$17.00	$37.00
Carwheels, Philadelphia	18.00	18.00	18.00	40.00
Heavy steel scrap, P'gh	*12.50*	13.00	14.00	27.00
Heavy steel scrap, Phila.	*11.50*	12.50	13.00	24.50
Heavy steel scrap, Ch'go	11.00	11.00	13.00	23.50
No. 1 cast, Pittsburgh	*18.00*	20.00	22.00	34.00
No. 1 cast, Philadelphia	18.00	18.00	19.00	38.00
No. 1 cast, Ch'go (net ton)	*13.00*	13.50	15.75	37.00
No. 1 RR. wrot, Phila.	17.00	17.00	17.00	35.00
No. 1 RR. wrot, Chi'go (net)	*10.00*	10.50	12.00	27.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$3.75*	$4.00	$4.50	$10.00
Furnace coke, future	*4.00*	5.25	5.75	10.00
Foundry coke, prompt	*5.00*	5.25	5.50	11.00
Foundry coke, future	*5.50*	6.00	6.00	11.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*12.75*	13.00	12.75	19.50
Electrolytic copper, N. Y.	*12.50*	12.62½	12.25	19.25
Zinc, St. Louis	4.65	4.65	4.85	8.60
Zinc, New York	5.15	5.15	5.30	8.95
Lead, St. Louis	*4.25*	4.00	4.00	8.75
Lead, New York	4.25	4.25	4.00	9.00
Tin, New York	*28.50*	29.25	28.00	63.25
Antimony (Asiatic), N. Y.	*5.12½*	5.25	5.20	11.37½

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The above prices are for domestic delivery and do not necessarily apply to export business.

Altogether, it must be said that the market, as far as the independent companies are concerned, is more favorable to the buyers now than it has been at any time before since the reaction began.

Although the present temper of the situation is one of pessimism, there is much ultimate optimism and the week has brought forth at least one development which is regarded as a distinct forward step in the readjustment through which the industry is passing. This is the wage reduction just made in the Connellsville region, which is likely to be applied to all non-union fields, the effect of which already is beginning to be shown in coke prices. Lower fuel costs will enable pig iron producers to cut their costs and this brings nearer the time when prices can be named on pig iron which will stimulate renewed interest.

Business is not entirely absent by any means, but it does lack volume, as buyers are confining purchases very close to their actual needs. The building up of a back log with the demand of such a character is altogether out of the question and such change as there has been in plant operations has been in the direction of contraction. The Carnegie Steel Co. now has only 20 of its 59 blast furnaces making iron, this being the smallest number in blast since the first week of the steel strike in the fall of 1918. There has been a further tapering off of steel works activities of this company and other subsidiaries of the Steel Corporation have lost ground in the past week. There has been some increase in active independent sheet capacity, although the Allegheny Steel Co. suspended operations last Saturday and is not figuring upon a resumption before May 1 and not then unless there is a decided betterment in general conditions. Less independent pipe making capacity is in operation this week than previously. All furnaces of the Wheeling Steel Corporation are idle, this loss offsetting a gain in the Mahoning Valley. Orders for tin plates are not flowing in at all freely and while most of the mills which were active a week ago still are running, predictions are common of an early contraction. No gain in activities of bar, plate and structural mills can be reported.

Pig Iron.—The Oil Well Supply Co. has put out an inquiry for 1000 to 2000 tons of foundry iron for delivery between now and July 1, while the American Radiator Co. is asking prices on a total of 4600 tons of foundry iron, for early delivery, at its several plants. This company wants 3300 tons for its Buffalo works, 300 tons each for its Titusville, Pa., and Springfield, Ohio, plants, and 700 tons for its Detroit works. Neither inquiry has been closed and there is some doubt whether all of the iron asked for will be placed in the near future. As the Oil Well Supply Co. already has a good stock of iron its inquiry is regarded in some quarters merely as speculative. The American Radiator Co. is said to be delaying purchases in the expectation of obtaining supplies at lower prices than now prevails. Almost no interest is displayed in the steel-making grades or in malleable or gray forge iron. Since the Allegheny Steel Co. suspended operations last week and will be down until at least May, it is not expected to close immediately on the remainder of the tonnage for which it recently inquired. The furnaces of the A. M. Byers Co., Girard, Ohio, went out of blast last Thursday and it is expected that the Stewart Furnace Co. will blow out its furnace at Sharon, Pa., next week, as it already has ordered a curtailment of coke shipments. The latter company makes low phosphorus iron largely and has rather substantial stocks on its yards. It is quoting low phosphorus iron at $42 to $43, furnace. Average prices for basic and Bessemer iron

from Valley furnaces in March as compiled by W. P. Snyder & Co. were $24.50 for basic and $26.20 for Bessemer, as compared with $25 and $27 respectively in February. The decline is explained by shipments against contracts based on trade paper price averages.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$23.00 to $25.00
Bessemer	25.00 to 27.00
Gray forge	24.00 to 25.00
No. 2 foundry	25.00 to 26.00
No. 3 foundry	24.50 to 25.50
Malleable	25.00 to 26.00

Ferroalloys.—Business at no time since the recession set in last fall has been so nearly at a standstill as it is at present. About the only inquiry of any consequence before the trade is that for the naval ordnance plant, South Charleston, W. Va., calling for 15,000 pounds of ferrovanadium, 100 tons of 10 to 12 per cent ferrosilicon and 200 tons of 50 per cent ferrosilicon. This business is to be closed. The Allegheny Steel Co. recently closed for 150 tons of 75 per cent ferrosilicon at $140, furnace, freight allowed. Not enough business is being done in any of the alloys to establish definite prices. Domestic 76 to 80 per cent ferromanganese can be bought direct from producers at $90, and it is frankly stated that the appearance of a real order would start negotiations which would result in an even lower price. A price of $95 for 50 per cent ferrosilicon is nothing more than a quotation. At least one producer is open to business at $90, furnace, freight allowed, and it is believed others would meet this price if an order were presented.

We quote 76 to 80 per cent ferromanganese at $90 delivered on domestic and $100 c.i.f. Atlantic seaboard, the quotation of English producers. We quote average 20 per cent spiegeleisen at $32.50 to $35 furnace, 50 per cent ferrosilicon $90 to $95 furnace, freight allowed, for domestic and $90 to $95 delivered for foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $54.50; 10 per cent, $58; 11 per cent, $61.30; 12 per cent, $64.60. Silvery iron, 6 per cent, $40; 7 per cent, $41.50; 8 per cent, $43.50; 9 per cent, $45.50; 10 per cent, $48; 11 per cent, $51.30; 12 per cent, $54.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Prices are entirely nominal in the absence of sales or real inquiries upon which to base them. Most of the independent makers are quoting soft billets and sheet bars at $38, but this means almost nothing, since there are very few inquiries and almost no sales. With pig iron and scrap at their current levels, that price allows a rather wide margin on either billets or sheet bars, and it is commonly intimated that the price would be shaded materially on the appearance of a real order. It is stated that Mahoning Valley producers have offered to take business at $37 Youngstown, for sheet bars, going to nearby consumers, but have not been inclined to quote that price on a Pittsburgh base because of the freight which they would have to absorb.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $38; 2 x 2-in. billets, $40; Bessemer and open hearth sheet bars, $38; slabs, $37; forging billets, ordinary carbons, $43 to $43.50, all f.o.b. Youngstown or Pittsburgh mills.

Skelp.—Demand continues extremely limited because makers of pipe who do not make their own skelp are getting few orders, while the demand for boiler tubes is at a standstill. It is reported that some business was done a short time ago in universal mill skelp at $42 per ton, or 2.10c. per lb. This price could be repeated on desirable business, although the more general quotation of independent makers is 2.25c. for either grooved or universal steel skelp. The Steel Corporation still is quoting the March 21, 1919, bases of 2.45c., 2.55c., and 2.65c., respectively, for grooved, universal and sheared steel skelp.

Wire Rods.—There has been no change in quotations, which are $52 for the base size by independents and $57 by American Steel & Wire Co., but practically no business is being done owing to the unsatisfactory business in finished products into which rods enter, and the low prices which are being made to secure passing business in those products. It is stated that a real order for rods of any size could be placed well below the independent quotation, a price of $48 being mentioned. Prices are given on page 948.

Plates.—The appearance of several inquiries involving good-sized tonnages from tank builders, preliminary to making quotations on the finished tanks, has revived competition among plate makers and unsettled the market.

We quote sheared plates of tank quality ¼ in. and heavier at 2c. to 2.65c., Pittsburgh.

Structural Material.—Fabricating interests continue to report a good inquiry, but also a tendency upon the part of investors to defer placing orders. The McClintic-Marshall Co. has taken 11 signal bridges for the Delaware, Lackawanna & Western Railroad for erection at Harrison, N. J., involving 100 tons. It also has taken 350 tons for steel floors for railroad bridges for the New York Central Lines and the Chicago, Rock Island & Pacific Railroad at Chicago, and also 100 tons for a viaduct for Columbia, S. A., placed by the Baldwin Locomotive Works. Tank builders are figuring against some rather attractive inquiries, the Anglo Mexican Oil Co. being in the market for tanks which will take about 2000 tons of steel, while the Midwest Refining Co. has put out an inquiry for storage tanks for Casper, Wyo., which will take about 5000 tons of plain material. Actual business in plain material still is extremely limited, and while 2c. undoubtedly could be done on attractive orders, most of the independents are inclined to ask more against the small inquiries which are coming out. Prices are given on page 948.

Iron and Steel Bars.—Buyers with a real order to place would not have any trouble finding accommodation at 2c. Makers of iron bars in this territory are dependent to so large an extent upon railroad business, that the financial condition of the carriers is a real blow to them. The plant of one company is entirely down because of the lack of railroad buying and the fact that it has so much of its resources tied up because of the inability of the railroad to pay for materials already shipped. Other makers are operating at a very low rate. Between this condition and the likelihood of a further drop in wages of puddlers, at the next bi-monthly settlement, lower prices for iron bars are indicated.

We quote steel bars rolled from billets at 1.95c. to 2.35c.; reinforcing bars, rolled from billets, 2c. to 2.35c. base; refined iron bars, 2.75c., in carloads, f.o.b. mill, Pittsburgh.

Wire Products.—Buyers continue to purchase only their actual requirements and these do not vary much from week to week.

We quote wire nails at $3.00 to $3.25 base per keg, Pittsburgh, and bright basic and Bessemer wire at $3 to $3.25 base per 100 lb., Pittsburgh.

Steel Rails.—Inquiries are few and small and competition for business is so keen that the advantage in prices is entirely with buyers. It is stated that some of the companies rolling standard sections are rerolling rejected rails into the smaller sizes and offering them down as low as 3.25c.

We quote 25 to 45-lb. sections, rolled from new steel, 2.25c. to 2.75c.; rolled from old rails, 2.25c.; standard rails, $45, mill, for Bessemer, and $47 for open-hearth sections.

Nuts, Bolts and Rivets.—Plants here are not averaging more than three days a week and to a large extent the operations are for the purpose of using up such raw material as is on hand and the product is going into stock. Prices and discounts are given on page 948.

Spikes.—Prices largely are untested, and real orders probably would develop fresh concessions. Prices are given on page 948.

Cut Nails.—The recent reduction in prices by the Wheeling Steel Products Co. has been met by the Reading Iron Co. and both companies now are quoting 3.75c. base for carloads. The price of the former company is f.o.b. Wheeling and of the latter f.o.b. Birdsboro or Pottstown, Pa.

Hot-Rolled and Cold-Rolled Strips.—Business is better both as regards releases against unshipped orders

and new commitments. This development reflects largely the improvement in the automobile industry. Prices are unchanged, hot-rolled strips ranging from 2.80c. to 3.05c., and cold-rolled from 5.65c. to 6c. The American Steel & Wire Co. quotation on cold-rolled strips is 6.25c., but business at that figure is out of the question.

Cold-Finished Steel Bars.—Newspaper accounts of the improvement in operations of the automobile industry are gross exaggerations if business in cold-finished steel bars is a criterion. Very little new business in these bars is developing from the automobile manufacturers and releases against suspended orders are few and do not involve much tonnage. Demands from other users also are limited and capacity is even more poorly engaged now than it has been at any time since the tide of business began to ebb. The range of quotations still is 3c. to 3.25c. base, Pittsburgh, but the lower price represents the maximum possibilities on anything like a desirable order. An order for a carload these days is a rarity, and buyers seeking as little as 5 and 10 tons frequently specify several sizes.

Hoops and Bands.—Business shows no improvement and the independent market is largely a buyers' affair. A quotation of 2.75c. has been made by at least one producer and it is believed that even this price would be shaded to secure an order. The Steel Corporation price holds at 3.05c., but business at this figure is practically impossible.

Iron and Steel Pipe.—Demand is only fair and some of the independents anxious to keep some of their capacity in operation are making price concessions. The regular discount to jobbers in addition to the regular quotation is one 5 and 2½ per cent, but lately an extra 2½ to 5 per cent has been given and it is reported that 59½ per cent off list on the base size has been named to secure orders. Those not shading the regular quotation are said to be guaranteeing prices against a decline. The situation in oil looks a little better, but this has found no reflection in the demand for oil country. Discounts are given on page 948.

Boiler Tubes.—Demand rarely has been as light as it is at present and quotations bear little relation to what actually might be done if makers had a chance to quote. Discounts are given on page 948.

Sheets.—Increased activity among the automobile manufacturers has brought about increased specifications against suspended orders for sheets and also a few new orders of moderate size. Independent makers of these sheets are busier than they have been and the American Sheet & Tin Plate Co. has started up in part its works at McKeesport, which ordinarily runs heavily to the production of automobile sheets. The Ford Motor Co. is reported to be running almost full and the average operations of other makers are estimated this week at 35 per cent of capacity as compared with about 25 per cent a week ago. General demand for sheets is no better than it has been and prices still lean in favor of buyers, as is evident from the fact that some makers would go as low as 3.75c. base to secure orders in black sheets and 4.85c. base has been quoted against inquiry for galvanized sheets. The McClintic-Marshall Co. recently closed for about 300 tons of painted corrugated sheets for roofing and siding of the new plant of the International Nickel Co., Huntington, W. Va. Prices are given on page 948.

Tin Plate.—A Pittsburgh food packer who recently put out an inquiry for 40,000 boxes has placed a portion of this business and it is reported that it went at less than $7 per base box, which hitherto has been regarded as the regular base on production tin plate. Container manufacturers generally are pursuing a hand to mouth policy with regard to purchases and plant operations are beginning to run down. The American Sheet & Tin Plate Co. last week operated at above 55 per cent of capacity, but will not do that well this week, as it has suspended operations at LaBelle Works, Wheeling, W. Va., a plant of 10 hot mills. Operations of the independents ..re about 25 to 30 per cent.

Coke.—Recent wage reduction by independent operators in the Connellsville district, who have restored the Nov. 10, 1917, wage scale, already is finding reflection in coke prices. The Whitaker-Glessner Co. recently closed for about 15,000 tons of coke for one of its Portsmouth, Ohio, blast furnaces at $3.75 per net ton oven. This furnace ordinarily would be served from the by-product plant of LaBelle Iron Works, Steubenville, Ohio, a sister company, but this plant is down and it will take from four to six weeks to again get it into production. The sale establishes the spot market at $3.75 for furnace grade, although several operators are disinclined at the moment to go below $4. The Perry Iron Co., Cleveland, Ohio, the stack of which is at Erie, Pa., recently went into blast and is getting coke shipments against a suspended contract, the price of which has been revised to about $4.50. The decline in foundry coke prices has been slower and not as sharp as that in furnace grades. Strictly standard 72-hr. fuel is salable for spot shipment up to $6 per net ton oven. This price, however, is both maximum and extreme, the more general top being $5.50 while good coke is available at $5.25 and some running a little high in sulphur can be bought at $5 flat. The contract market in foundry coke is entirely nominal. This is particularly true in by-product grade, for which the demand is lightest, due to the lack of demand for coke and the unsettled and depressed market in the by-products. As low as $2 is reported to have been done on spot tonnages of the latter grade recently.

Old Material.—The decline in prices still is unchecked. Melters almost without exception are out of the market and dealers who have yards appear to have all the funds they care to have tied up, employed in the tonnages now lying on their yards. There is practically no market at the moment, and quotations merely are an approximation of what might possibly be done. Dealers report having been offered heavy melting steel at $12.50 to $13 delivered and other steel works grades are quoted in relation to the appraisal of the value of heavy melting steel. Making allowance for the increase in freight rates, which is a matter of almost 100 per cent and the fact that labor costs have more than doubled, heavy melting steel relatively is lower now than it was in the latter part of 1914, when the market ranged from $10 to $10.50 per gross ton delivered, Pittsburgh. This condition does not necessarily mean that prices have struck bottom. Prospects of any immediate revival of activities of the steel industry are so poor that it is figured it will be some little time before mills again are in the market for tonnages and anticipating that they will have to carry for a long time material purchased today, dealers are not inclined to lay down tonnages unless able to do so at lower prices than now prevail.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$12.50 to $13.00
No. 1 cast cupola size	18.00 to 19.00
Rerolling rails, Newark and Cambridge, O.; Cumberland, Md.; Huntington, W. Va.; Franklin, Pa., and Pittsburgh	15.00 to 15.50
Compressed sheet steel	10.50 to 11.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.00 to 9.50
Railroad knuckles and couplers	13.50 to 14.00
Railroad coil and leaf springs	13.50 to 14.00
Railroad grate bars	13.00 to 13.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and heavier	19.00 to 20.00
Railroad malleable	12.50 to 13.00
Iron car axles	32.00 to 33.00
Locomotive axles, steel	28.00 to 29.00
Steel car axles	16.00 to 17.00
Cast iron car wheels	15.00 to 16.00
Rolled steel wheels	13.50 to 14.00
Machine shop turnings	8.00 to 9.00
Sheet bar crop ends at origin	13.50 to 14.00
Heavy steel axle turnings	11.00 to 11.50
Short shoveling turnings	9.50 to 10.00
Heavy breakable cast	14.50 to 15.00
Stove plate	13.00 to 13.50
Cast iron borings	10.00 to 10.50
No. 1 railroad wrought	14.00 to 14.50

Chicago

CHICAGO, April 5.

The Illinois Steel Co. has lost three active blast furnaces within the past week, one which was on ferromanganese at South Chicago having been blown out and two at Joliet having been banked. Only nine out of the company's 29 furnaces in the district remain in blast, two of them being at South Works and seven at Gary. In steel production, this interest has also lost ground, now operating at less than 40 per cent of ingot capacity. The Inland Steel Co. is producing at the same rate as heretofore, 67 per cent on pig iron and between 35 and 40 per cent on steel. The Wisconsin Steel Co. continues to operate two out of three blast furnaces and about 40 per cent of its rolling capacity. With the exception of the Interstate Iron & Steel Co., which is starting up its steel plant this week with about a month's work ahead, other independents are on about the same basis as heretofore with intermittent operation the rule. Merchant pig iron production shows no change for the better.

Notwithstanding the fact that production is at a low rate, the business outlook is somewhat improved. Mill and furnace bookings, though still light, are better than they were 30 days ago. The automobile industry is gaining ground and the steady improvement in building operations, particularly in dwelling house construction, has been reflected in better output by manufacturers of sanitary ware plumbing goods and building hardware. Municipalities in increasing numbers are covering for their cast iron pipe requirements. The progress which is being made by automobile plants is indicated by the fact that other manufacturers besides the Ford company are getting back on their feet. The Dodge company is now producing 400 cars a day as against a normal output of 625, while the Nash at Kenosha is turning out 115 a day five days a week as compared with 170 per day when running normal.

The more favorable aspect of the market is largely accounted for by business in sight rather than actual increases in orders for material. In this connection it should be noted, however, that the tendency of many buyers is to postpone purchases on the assumption that Judge Gary's return from Panama means an early announcement of new prices by the various corporation subsidiaries. Numerous rumors have gained circulation as to the extent of the price and wage cuts which will be made but none of them comes from an official source.

Pig Iron—While buying is still far below normal, there are indications of improvement. The leading Northern merchant shipped 30 per cent more iron in March than in February and shipments in April promise to be proportionately larger than in March. Of the three active furnaces reported by this seller, the Mayville stack is now shipping its entire output, the Iroquois furnace in blast is producing Bessemer pig iron for the Mark pipe mills, while the active Federal furnace is still piling some material. It is to be noted that sales of small orders ranging from carloads up to 100 tons are more numerous than heretofore. Some of the foundries serving the automobile industry are again getting busy. One of them, a Michigan plant, is now in the market for 500 tons of malleable for prompt delivery. A local steel plant which specializes in alloy steel for automobile makers will start up this week with about a month's work ahead and has bought a large tonnage of basic, reported to be about 2000 tons, at a price which is said to compare favorably with any thus far named in this section. The Link Belt Co. has bought 300 tons of malleable at $24, Chicago furnace, and 200 of No. 2 foundry at $23.75, local furnace. No. 2 foundry is obtainable in carload lots at $25 while purchases running into hundreds of tons can be made at from $1 to $2 less, depending on the attractiveness of the business. The only important development in the price situation is the disappearance of the Redfield schedule for silicon content, a 50c. differential for each step up in silicon now being the rule. Local by-product foundry coke has been reduced to $11.75, ovens, with the freight allowed to foundries within the Chicago switching district. Beehive foundry coke of ordinary grade is available at from $5.50 to $6.50, Connellsville.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 70c. per ton:

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$38.50
Northern coke, No. 1 sil. 2.25 to 2.75	25.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	24.00
Northern high phos	25.00
Southern coke, No. 1 foundry and No. 1 soft sil. 2.75 to 3.25	34.67
Southern coke, No. 2 foundry, sil. 2.25 to 2.75	32.92
Southern foundry, sil. 1.75 to 2.25	31.67
Malleable, not over 2.25 sil.	24.00
Basic	25.00
Low phos. Eastern furnace (copper free)	37.50
Silvery, sil. 8 per cent	40.00

Ferroalloys.—The market is quiet and prices are unchanged.

We quote 75 to 80 per cent ferromanganese, $90 to $95 delivered; 50 per cent ferrosilicon, $90 to $95 delivered; spiegeleisen, 18 to 22 per cent, $40 to $42 delivered.

Railroad Rolling Stock.—The Great Northern is in the market for 500 refrigerator cars and the United States Fuel Co., a subsidiary of the United States Steel Corporation, is inquiring for 300 mine cars for the Bunsenville mine, Vermilion County, Ill. The Santa Fe has bought 50 locomotives from the Baldwin Locomotive Works.

Sheets.—Inquiries continue to be received from the Far East, but as yet most of them are in the nature of feelers. One sale of 600 tons about equally divided between black and galvanized has been made for early delivery at Kobe, Japan. As a whole, demand for sheets is small, despite the fact that automobile manufacturers continue to reinstate suspended contracts. Independent quotations show sharp variation but ruling prices appear to be settling to 2.65c., 3.65c. and 4.60c., base, Pittsburgh, respectively, for blue annealed, black and galvanized. The expected announcement of new prices by the leading interest is awaited with interest.

Mill quotation are 3.65c. to 4.35c. for No. 28 black; 2.65c. to 3.55c. for No. 10 blue annealed, and 4.60c. to 5.70c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 4.13c.; No. 28 black, 5.40c.; No. 28 galvanized, 6.40c.

Plates.—Judge Gary's return from Panama this week is expected by many buyers to result in a prompt announcement of new prices by the Steel Corporation and the tendency therefore has been to delay action on pending business. No action has been taken on the steel plates for oil storage tanks for foreign delivery which appears to involve 3000 tons instead of 1500 as reported a week ago. The Standard Oil Co. has received figures on 3840 tons of 98¼-in. plates, 1680 tons of 74½-in. and 840 tons of lighter plates and sheets for 24 oil storage tanks for Casper, Wyo. It is understood that the inquiry was put out principally to test the market and that authorization of the project will depend on the character of the prices submitted. Aggregate demand for plates is light and prices are substantially unchanged.

The mill quotation is 2c. to 2.65c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.23c. for plates out of stock.

Structural Material.—The building outlook is improving, although as yet small building projects predominate. In March building permits for dwelling houses in Chicago showed an increase of 190 per cent over February, while permits for apartment buildings increased 80 per cent. While architects and fabricators are figuring on considerable work involving steel, actual lettings are still rather light. Mills continue to note a slight increase in structural business, but bookings are not in proportion to current construction awards because of the large stocks of plain material which fabricators have not yet disposed of. Independent mill quotations on plain material range from 2c. to 2.10c. Pittsburgh. Recent lettings include:

First National Bank, Indianapolis, 800 tons, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

Building No. 33, Corn Products Refining Co., Kansas City, 233 tons, to Christopher & Simpson Iron Works.

Union Liberty Furniture Co. building, Chicago, 750 tons,

to A. Bolters Sons, previously reported as having been let to another fabricator.

Commercial station for St. Paul Postoffice, St. Paul, Minn., 386 tons, to Gage Structural Steel Co.

Northeast Senior High School, Minneapolis, 346 tons, to Crown Iron Works.

Two junior high schools, Cedar Rapids, Iowa, 300 tons, to Iowa Steel & Iron Co., previously reported awarded to another fabricator.

High school building, Two Rivers, Wis., 178 tons, to unnamed fabricator.

Axelson Machine Co., machine shop, St. Louis, 128 tons, to Stupp Bros.

Pending inquiries include:

Montgomery Ward & Co., Chicago, 15 55,000-bbl. oil tanks for export, 3045 tons.

Standard Oil Co., 24 oil tanks, Casper, Wyo., 6360 tons.

The mill quotation is 2.10c. to 2.45c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.23c. for materials out of warehouse.

Bolts and Nuts.—The price situation remains as unsettled as ever, but sellers have gleaned some encouragement from the slow, but progressive, improvement in the automobile industry. A Wisconsin maker of automobile frames is commencing to release suspended orders for rivets and to place some new orders. The automobile makers themselves are in most cases working against large inventories, but at the rate which some of them are now operating it should not take long for new requirements of some sort to develop. The Ford Motor Co. is reported to be turning out 3500 cars a day, while the Dodge company is producing 400 as against a maximum of 625. The Paige and Packard plants are operating at close to normal, while Reo and Olds are on a 55 to 65 per cent basis. For manufacturers' prices see finished iron and steel, f.o.b. Pittsburgh, page 948.

Jobbers quote structural rivets, 4.88c.; boiler rivets, 4.98c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 45 off; carriage bolts up to ⅞ x 6 in., 40 off; larger sizes, 40 off; hot pressed nuts, square and hexagon tapped, $1.60 off; blank nuts, $1.85 off;; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off. Quantity extras are unchanged.

Wire Products.—The outlook for business is better, as reflected in the rapid reduction of jobbers' stocks, but this buying by the ultimate consumer has not yet resulted in heavier bookings for the mills. No doubt the expectation that the return of Judge Gary will be followed by price reductions by the leading interest is holding up orders from the jobbers. Considerable small building work is being undertaken, principally dwelling houses, and this is stimulating the consumption of nails. This may account for the fact that one important independent has abandoned the differential between wire and wire nails and is quoting both at $3 f.o.b. Pittsburgh. Wire rods are weak, as evidenced by the fact that independent quotations of as low as $48 base have been named as against the leading maker's price of $57. The leading local jobber has again reduced its prices on nails, its new quotations being $3.85 a keg on common wire nails and $3.25 on cement coated nails, f.o.b. warehouse. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 948.

Rails and Track Supplies.—In the month of March, the Gary mill rolled and shipped 92,600 tons of rails, thereby establishing a new world's record for a rail mill. New business in rails and track fastenings is at a very low ebb. The Chicago & Northwestern is inquiring for 200 tons of light rails for one of its coal mines. Competition on light rails is very keen, as low as $48 per gross ton delivered Illinois mine being reported as having been made by a rerolling mill.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails, 2.45c. to 2.50c. f.o.b. makers' mills.

Standard railroad spikes, 3.65c., Pittsburgh. Track bolts with square nuts, 4.60c., Pittsburgh. Steel tie plates, 3c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.90c. to 3c., f.o.b. makers' mills.

Bars.—The increasing operations of automobile plants have as yet resulted in the placing of little new tonnage, but inventories are steadily being reduced and releases against suspended orders are more numerous. A local mill specializing in alloy steels will start up this week with about a month's work ahead. The prospects are not bright for normal purchases of bars by the agricultural implement manufacturers. Yet even this industry reports that tillage tools moved in heavier volume in March than in February and sales of tractors showed slight improvement. In the aggregate, the demand for bars from all sources remains light. The minimum independent quotation on mild steel bars is still 2c. Pittsburgh. Buying of bar iron is light. The railroads, ordinarily large consumers, are purchasing nothing. Some mills are quoting iron on the same basis as steel, that is, 2c. to 2.10c. Pittsburgh, or the equivalent of 2.38c. to 2.48c. Chicago.

Mill prices are: Mild steel bars, 2c. to 2.35c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 2.38c. to 2.48c., Chicago; rail carbon, 2.25c. mill.

Jobbers quote 3.13c. for steel bars out of warehouse. The warehouse quotation on cold rolled steel bars is 4.63c., an extra of 15c. per 100 lb. applying to orders exceeding 1000 lb. and under 2000 lb. and an extra 35c. on orders up to 1000 lb. Jobbers quote hard and medium deformed steel bars at 2.73c. to 3c. base.

Cast-Iron Pipe.—Municipalities in increasing number are entering the market for their needs and considerable business is being placed from week to week. The Lynchburg Foundry Co., last week reported as low bidder on 1450 tons for Milwaukee, has been awarded the business. The Milwaukee Gas Co. is considering the purchase of 3000 tons, but has not yet issued a formal inquiry. Topeka, Kan., has let 225 tons to the United States Cast Iron Pipe & Foundry Co. Pending business includes:

Earlville, Ill., 152 tons, bids in April 5.
Elyria, Ohio, 300 tons, April 5.
Park Falls, Wis., 154 tons, April 6.
Joliet, Ill., 100 tons, April 11.
Cleveland, 3000 tons, April 8.
Akron, Ohio, 1000 tons, April 8.
Youngstown, Ohio, 300 tons, March 28.
Shenandoah, Iowa, 100 tons, March 31.
Fond du Lac, Wis., 107 tons, April 8.

We quote per net ton f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $69.10; 6-in. and above, $64.10; class A and gas pipe, $4 extra.

Old Material.—The market received a slight stimulus last week as a result of the cleaning up of old contracts for heavy melting and malleable which expired with the end of the month. The market is generally quiet with perhaps a little more buying by dealers to enlarge their reserve stocks. Present prices, in the opinion of some observers, are close to rock bottom and in this connection it is to be noted that fewer declines are recorded this week than for some time. Railroad offerings are few. The Santa Fe lists 3700 tons and the Missouri, Kansas & Texas 1800 tons, while the Erie advertises a blind list.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$17.50 to $18.00
Relaying rails	30.00 to 32.50
Car wheels	14.00 to 14.50
Steel rails, rerolling	12.50 to 13.00
Steel rails, less than 3 ft.	12.50 to 13.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards, cut apart	11.00 to 11.50
Shoveling steel	10.50 to 11.00
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	7.50 to 8.00
Hydraulic compressed sheet	9.00 to 9.50
Axle turnings	8.00 to 8.50
Per Net Ton	
Iron angles and splice bars	15.50 to 16.00
Steel angle bars	10.00 to 10.50
Iron arch bars and transoms	14.50 to 15.00
Iron car axles	22.50 to 23.00
Steel car axles	14.00 to 14.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.50 to 8.00
Cut forge	9.50 to 10.00
Pipes and flues	7.50 to 8.00
No. 1 railroad wrought	10.00 to 10.50
No. 2 railroad wrought	9.50 to 10.00
Steel knuckles and couplers	11.00 to 11.50
Coil springs	12.00 to 12.50
No. 1 cast	13.00 to 13.50
Low phos. punchings	11.00 to 11.50
Locomotive tires, smooth	10.00 to 10.50
Machine shop turnings	5.50 to 6.00
Cast borings	6.50 to 7.00
Stove plate	14.00 to 14.50
Grate bars	10.00 to 10.50
Brake shoes	10.00 to 10.50
Railroad malleable	12.00 to 12.50
Agricultural malleable	12.00 to 12.50
Country mixed	8.50 to 9.00

Judge Gary in Chicago

CHICAGO, April 5.—Judge E. H. Gary, chairman United States Steel Corporation, arrived from Los Angeles, Cal., to-day. He said to-night that he had declined to discuss business and politics while on his trip and he refused to make any statement in regard to prices or wages.

New York

NEW YORK, April 5.

Pig Iron.—A fair tonnage of No. 2X foundry iron has been sold at from $26 to $26.50, eastern Pennsylvania furnace. A cast-iron pipe company has purchased about 2000 tons of lower grades on the basis of $24.50, furnace, for No. 2 plain. A Jersey City gas appliance company purchased about 300 tons of foundry iron.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$28.52 to $29.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.52 to 28.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	26.52 to 27.52
Buffalo, sil. 1.75 to 2.25	32.46 to 33.46
No. 2 Virginia, sil. 1.75 to 2.25	31.16 to 32.16

Ferroalloys.—Demand for both ferromanganese and spiegeleisen is confined to small lots for early shipment, most of which have been sold by American producers at $90, delivered, for the former and at $32 to $36, furnace, for the latter, which are the prevailing quotations. The quotation for the British alloy is unchanged at $100, seaboard, but any test of the market would bring a concession equal to that offered by American producers. Manganese ore is inactive, with quotations nominal at 30c. to 35c. per unit, seaboard. The 50 per cent ferrosilicon market is exceedingly quiet with quotations largely nominal at $92 to $95 per ton, delivered. Quotations for lump ferrotungsten, guaranteed, are 58c. per lb. contained tungsten. On Jan. 15 quotations for ferrovanadium by the leading interest were changed so that the standard alloy for open-hearth practice, high in silicon, is quoted at $5 per lb. of contained vanadium as a base, with 75c. to $2 per lb. extra as differentials asked for the other grades of alloy depending on the composition and the quantity. Ferrochromium, 4 to 6 per cent carbon, is quoted at 16c. to 16.50c. per lb. of contained chromium, f.o.b. producer's plant, at which level some fair sized sales are noted. Ferrocarbontitanium, 15 to 18 per cent, is selling at $200 per net ton in carload lots, at $220 per ton in lots between one ton and a carload, and at $250 per ton in lots less than a ton.

Warehouse Business.—Although business is generally unchanged, some dealers report a slight improvement for the beginning of this month compared with the same time last month. Mill deliveries on some materials in small lots are slow. Practically all warehouses in New York, with the exception of the leading interest, have revised prices downward, following the action of the warehouses in Pittsburgh and Chicago. Iron and soft steel bars are now quite generally quoted at 3.23c. per lb. delivered in the metropolitan district. Steel plates, ¼ in. and heavier, are 3.33c. per lb.; 3/16 in., 3.54c. per lb. Sheets are quoted at 4.23c. per lb. for No. 10 gage, blue annealed; 5.38c. per lb. for No. 28 gage black sheets, and 6.38c. per lb. for No. 28 gage galvanized. Tire steel is 3.28c. per lb. for iron finish and 3.43c. per lb. for smooth finish. Toe calk steel has been reduced from 4.25c. per lb. to 3.75c. per lb. Standard steel pipe is down about 10 per cent. While business in the brass and copper market is small, it is evidently developing a steadier tone. We quote prices on page 964.

High Speed Steel.—The market continues quiet, with the prevailing quotations at from $1 to $1.10 per lb. for 18 per cent tungsten high speed steel.

Finished Iron and Steel.—Plans for the Federal Reserve Bank, New York, will be ready for estimating in two or three weeks. The steel requirements total about 12,000 tons for the building and 3000 to 4000 tons for vaults. Bids have been taken on 1200 tons of bridge work for the Baltimore & Ohio Railroad. Other projects up for bids include 7000 tons for additions to the department store of L. Bamberger & Co., Newark, N. J.; 700 tons for an office building, Jersey City, N. J.; 1150 tons for a power house for the Edison Co., Boston; 300 tons for a garage at Broadway and 126th Street, New York. Contracts awarded are as follows: 600 tons for an apartment house, 1672 Broadway, New York, to National Bridge Works; 450 tons for a Junior League building, Brooklyn, Hay Foundry & Iron Works; 850 tons for a paper mill at Tonawanda, N. Y., to Lackawanna Bridge Co.; 300 tons for a highway bridge at Elizabeth, N. J., to American Bridge Co.; 600 tons for an office building at New Haven, Conn., to American Bridge Co.; 200 tons for a highway bridge in North Carolina to Phoenix Bridge Co.; 400 tons for a plant for the Easton Structural Steel Co., Easton, Pa., to the Harris Structural Steel Co. The Atchison, Topeka & Santa Fe Railroad has let 50 locomotives to the Baldwin Locomotive Works, and Lukens steel has been specified, requirements being about 1500 to 2000 tons. It is also stated that 30 locomotives for China, which were ordered from the Baldwin Locomotive Works some time ago and then held up, have been reinstated. The Erie Railroad has inquired for 1000 steel-frame box cars of 40 tons capacity. The American Car & Foundry Co. has also received an order from Mitsui & Co. for 300 small freight cars for China, requiring six tons of steel each, the steel to be supplied from the car company's own stock. Car companies are also drawing on stocks of steel held by the railroads for car repair work.

We quote for mill shipments, New York, as follows: Soft steel bars, plates and structural shapes, 2.38c. for largest lots, except from the United States Steel Corporation, which is asking 2.35c., 2.65c. and 2.45c., Pittsburgh, respectively; bar iron, flats, wider than 6 in., 2.98c., with half extras; light rounds, squares and flats, 3.48c., with full extras, and other sizes, 2.48c., with half extras.

Cast Iron Pipe.—Business is more encouraging from standpoint of both volume of inquiries and sales. The city of Boston recently bought 2000 tons of 8 to 36-in. pipe from the Warren Foundry & Machine Co., 11 Broadway, New York, and is in the market for approximately 1,000,000 lb. of water department supplies, including 470,000 lb. curves, branches, sleeves, gate parts, etc., all core work; 150,000 lb. or 300 cast iron gate boxes; 30,000 lb. small pipe fittings; 120,000 lb. frames and covers; 43,000 lb. frames and covers having a 9 x 9-in. flange; 17,000 lb. composition rough castings; 75 8-in. gates complete, and 175 9-in. gates complete. Patterns will be furnished on all jobs except the gates. New Bedford, Mass., will shortly be in the market for about 6000 tons of 48-in. pipe.

Old Material.—The small amount of business transacted indicates that prices are still descending. For instance, a broker who was offering $12.25 delivered to Claymont, Del., for heavy melting steel, now offers but $11. The same broker has reduced buying prices on 11 other items and raised slightly on one during the week, declines averaging 75c.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$8.00 to $8.50
Rerolling rails	10.00 to 11.00
Relaying rails, nominal	40.00 to 42.50
Steel car axles	10.00 to 11.00
Iron car axles	27.00 to 28.00
No. 1 railroad wrought	11.00 to 11.50
Wrought iron track	8.00 to 9.00
Forge fire	6.00 to 7.00
No. 1 yard wrought, long	9.00 to 10.00
Light iron	4.00 to 5.00
Cast borings (clean)	5.00 to 6.00
Machine-shop turnings	4.50 to 5.00
Mixed borings and turnings	4.50 to 5.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.00 to 10.00
Stove plate	11.00 to 12.00
Locomotive grate bars	10.00 to 11.00
Malleable cast (railroad)	10.00 to 11.00
Old car wheels	11.00 to 12.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	$18.00 to $19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	17.00 to 18.00
No. 1 heavy cast, not cupola size	13.00 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	12.00 to 13.00

Cleveland

CLEVELAND, April 4.

Iron Ore.—There was a further curtailment in mining operations April 1 and the production by independent mining companies in the Lake Superior district is now only about 25 to 30 per cent of normal, according to estimates of ore shippers. There are no signs of any activity in the ore market and ore firms do not look for a buying movement for several weeks, consequently there is little talk regarding ore prices. The Pittsburgh Steamship Co. has postponed its fleet meeting until April 27 and will not put its ore boats in commission until May. Independent ore firms have not decided

when they will put their boats in operation, but their start will be very late, as there will be little demand from the furnaces for early season shipments.

We quote delivered lower lake ports: Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesabi Bessemer, $7.20; Mesabi non-Bessemer, $6.55.

Pig Iron.—Prices on foundry iron have virtually settled down to the $25 base for No. 2, at which price most of the business placed during the week was taken, although one 200-ton lot sale was reported at $24.75. However, two furnace interests, one with a furnace in the Valley and another producing iron in Cleveland, are still asking $26. Locally, prices have eased off $1 a ton to meet Valley competition, and foundry iron can be purchased at $26.50 delivered Cleveland. There is little change in the volume of business. Producers report a few sales in lots ranging from a carload to 200 tons for prompt shipment. One lake furnace reports a few sales at $25.50 to $26, but its last orders were on the $25 basis. The American Radiator Co. is inquiring for 700 tons of foundry iron for its Detroit plant and the Standard Sanitary Mfg. Co. is in the market for 500 tons of Southern iron for its Louisville plant, both inquiries being for early shipment iron, and the latter company is expected to buy some Northern foundry iron for its Pittsburgh plant. An Erie foundry has taken 100 tons of foundry iron and 100 tons of malleable iron. Another Erie consumer who inquired for 500 tons of foundry iron for the third quarter was quoted $26, but decided to postpone buying. Pig iron shipments apparently showed a little improvement in March as compared with February. One producer reports a gain of about 33 per cent and another a gain of 25 per cent during March, as compared with the previous month. In both cases the increase in shipments was largely to western New York and western Pennsylvania and New England. Furnaces whose shipments go largely to the Central West report little change in March shipments as compared with February, although one had a little falling off in shipping orders. Smaller foundries in the Central West are taking shipments much better than large consumers. One large stove foundry which has taken no iron on one contract since October, advised that it would probably not order shipments resumed inside of three months.

We quote delivered Cleveland as follows, based on the new freight rates, these being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic		$24.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$26.50 to	27.50
Southern fdy., sil. 2.25 to 2.75		32.92
Ohio silvery, sil. 8 per cent		46.86
Standard low phos., Valley furnace	41.50 to	42.00

Coke.—Some grades of foundry are somewhat lower and quotations now range from $5.50 to $7.25 per net ton at oven for standard Connellsville makes. Virginia foundry coke is quoted at $8 and Indianapolis by-product coke at $7.85. Sales are limited to car lots.

Bolts and Nuts.—The demand for bolts and nuts continues light, being limited to small lots, and inquiries show no improvement. Local makers appear to be holding to regular prices, not meeting the concessions reported by manufacturers in Chicago.

Semi-Finished Steel.—Inquiries for sheet bars have become fairly active and one sale of 500 tons is reported at $35, Pittsburgh. A local mill has rejected offers at that price which would amount to only $32.50, Cleveland, and consumers do not seem inclined to pay more. An Ohio mill is inquiring for 1000 tons of slabs.

Finished Iron and Steel.—A few round lot orders for plates and structural material are pending, but the volume of inquiries from industrial plants continues rather light. Some buyers are withholding orders, awaiting an expected announcement of price reductions by the Steel Corporation. A tank shop in this territory has taken oil tank work requiring 2400 tons of plates which have not yet been placed, and other new inquiries for oil tanks have come out that will require 2000 to 3000 tons of steel. In structural lines, fabricating contracts requiring 7200 tons of steel will be placed in a few days for the Federal Reserve Bank building, which will require 4500 tons, or less than originally estimated, and the Wade Park Manor Apartment House, 2700 tons, which has been held up for some time. John Gill & Sons have taken the general contract for both buildings. Bids are being taken for two Cleveland school buildings requiring 500 tons. The Columbus, Delaware & Marion Railroad is inquiring for 330 tons of rails and steel ties for these rails. There is virtually no change in the price situation.

Sheets.—The demand for sheets from the Detroit automobile manufacturers shows a marked improvement, but most of the business is in the release of suspended tonnage rather than in the placing of new orders. Some barrel manufacturers and other consumers have inquired for round lots for extended delivery, apparently hoping to bring out attractive prices, but these, on finding mills unwilling to quote for shipment beyond June, are limiting their orders to small lots. Ruling minimum quotations are 3.75c. for black, 2.75c. for blue annealed in the heavier gages and 2.85c. in the lighter gages, and 4.75c. for galvanized sheets. However, one Valley mill, the Brier Hill Steel Co., has advanced its minimum prices to 4c., 3c. and 5c. for black, blue annealed and galvanized sheets respectively.

Warehouse Business.—Leading Cleveland jobbers have reduced warehouse prices, basing the new prices on a 2c. mill price for bars and 2.10c. for plates and structural material. The Carnegie Steel Co. has made no change in its prices.

Cleveland warehouses quote steel bars and small shapes at 2.99c.; plates, 3.90c.; structural shapes, 3.90c.; No. 9 galvanized wire, 4.45c.; No. 9 annealed wire, 3.75c.; No. 28 black sheets, 5.00c.; No. 28 galvanized, 6.00c.; No. 10 blue annealed, 4.00c.; hoops and bands, 3.69c.; shafting, 4.25c.

Rivets.—The rivet market is weak and while regular prices have not been changed, concessions of $1 a ton to $3.65 for structural and $3.75 for boiler rivets have become fairly common and prices as low as $3.50 for structural and $3.60 for boiler rivets are reported for larger orders.

Old Material.—Scrap prices have further declined on nearly all grades and dealers declare that prices are now about down to the 1914 level, when the present freight rates are taken into consideration. Heavy melting steel was quoted around $9.25 in the local market late in 1914. There is virtually no change in market conditions. A local mill has purchased a few small lots of heavy melting steel at $12 to lay down in its yard, and turnings are being purchased by dealers in small lots for yard stocks at $6 to $7. With the present low scrap prices and high freight rates the freight charges in some cases exceed the cost of the scrap. In one case a Cleveland dealer purchased cast iron borings from a Michigan producer at $5.70 per ton, for shipment to Pittsburgh, and the freight on this scrap was $7.42 per ton.

We quote, delivered consumers' yards in Cleveland and vicinity, as follows:

Heavy melting steel	$11.75 to $12.00
Steel rails, under 3 ft	14.50 to 15.00
Steel rails, rerolling	14.50 to 15.00
Iron rails	14.50 to 15.00
Iron car axles	23.00 to 24.00
Low phosphorus melting scrap	14.00 to 15.00
Cast borings	8.00 to 9.00
Machine shop turnings	6.00 to 7.00
Mixed borings and short turnings	8.00 to 8.50
Short turnings for blast furnaces	8.00 to 8.50
Compressed steel	9.00 to 10.00
Railroad wrought	12.50 to 13.00
Railroad malleable	13.50 to 14.00
Steel axle turnings	10.00 to 10.50
Light bundled sheet stampings	6.00 to 7.00
Drop forge flashings, over 10 in.	6.50 to 7.00
Drop forge flashings under 10 in.	7.00 to 8.00
No. 1 cast	17.00 to 18.00
No. 1 busheling	8.00 to 9.00
Railroad grate bars	14.50 to 15.50
Stove plate	14.50 to 15.50
Cast iron car wheels	14.00 to 14.50
Pipes and flues	7.00 to 8.00

Boston

BOSTON, April 5.

Pig Iron.—The market has suffered a relapse, local pig iron houses reporting no sales this week. A superficial survey of foundries discloses less activity in spots, especially in the textile machinery field. Many foundries report having sufficient iron on hand or on order to fill all requirements for the next two to nine months. Such estimates are based, however, on present rates of production, which average not more than 15 per cent of capacity. In the absence of business, prices are purely nominal, and yet the market appears steadier. Sentiment among the foundry owners is not depressed, notwithstanding business conditions, and many are con-

vinced pig iron is on bottom, while recent letters from furnaces intimate they will go out of blast rather than reduce prices further in competition for what little business there is. This policy is substantiated in part, at least, by two additional Buffalo furnaces going out of blast this week. The available supply of resale iron is much reduced, and there has been a cash readjustment on a large percentage of contracts since Feb. 1. In addition, considerable significance is attached to the coal situation on the other side of the Atlantic. Delivered pig iron prices follow:

East. Penn., sil 2.25 to 2.75	$29.06 to $31.06
East. Penn., sil. 1.75 to 2.25	28.06 to 30.06
Buffalo, sil. 2.25 to 2.75	30.46 to 34.71
Buffalo, sil. 1.75 to 2.25	29.46 to 33.46
Virginia, sil. 2.25 to 2.75	33.58 to 35.83
Virginia, sil. 1.75 to 2.25	32.58 to 34.58
Alabama, sil. 2.25 to 2.75	39.41 to 41.91
Alabama, sil. 1.75 to 2.25	38.16 to 40.66

Finished Material.—A western Massachusetts street railway has bought 250 tons 80-lb. T-rails from the Lackawanna Steel Co., and the Boston & Worcester Street Railway 200 tons 75-lb. rails from the Bethlehem Steel Co. Bids will be taken early in May by Stone & Webster for about 300 tons structural steel for the Ford Hudson River hydro power plant project. The New York, New Haven & Hartford Railroad has awarded 120 tons boiler plates to a New Haven firm. Shapes, plates and bars have again been offered at 2c., f.o.b. Pittsburgh, but most mills will not sell for less than 2.10c. Bolt makers and drop forge interests are well stocked, consequently demand for bars is limited. Blue annealed sheets are still obtainable at $3, Pittsburgh, and galvanized for less than $5.

Coke.—Both the Providence Gas Co. and the New England Coal & Coke Co. continue to quote spot foundry coke at $12.66, delivered, and contract fuel at $12.29, delivered.

Warehouse Business.—Local quotations on wire nails have been reduced 0.25c., from 4.35. to 4.10c. per keg, base. Jobbers have bought carload lots of cut nails at $4.25, f.o.b. Pittsburgh, base. The demand for iron and steel is sufficiently large to necessitate small tonnages being placed with mills by jobbers now and then.

Jobbers now quote: Soft steel bars, $3.53 per 100 lb. base; flats, $4.40 to $4.75; concrete bars, $3.53 to $3.75; tire steel, $4.50 to $5; spring steel, open hearth, $6; crucible, $12; steel bands, $4.23 to $4.88; steel hoops, $4.90; toe calk steel, $5.50; cold rolled steel, $5 to $5.75; structural, $3.53 to $4.35; plates, $3.83 to $4.08; No. 10 blue annealed sheets, $4.83; No. 28 black sheets, $6.05; No. 28 galvanized sheets, $6.95; refined iron, $3.53 to $5.40; best refined, $5; Wayne, $8.50; Norway, $12.

Old Material.—The market the past week was featured by continued dullness and sagging prices. A sale of two cars No. 1 machinery cast is reported at $17, delivered, but it cannot be considered a criterion of the market. The Somerville Iron Foundry this week bought stove plate on a delivered basis of about $19. The material was delivered by truck from nearby yards. Important dealers are not willing to pay more than $10.50 to $11 for stove plate. The withdrawal of the Phoenix Iron Co., Phoenixville, Pa., from the market for machine shop turnings and rolling mill cast-iron borings has brought lower prices for all borings and turnings. An eastern Pennsylvania mill bought 100 tons No. 1 heavy melting steel at $12, delivered, but business is restricted by the spread in buyers' and sellers' ideas on prices. Forged scrap is the steadiest material on the market. It is in demand at $6 to $6.50. The Boston & Maine and the New York, New Haven & Hartford railroads have readjusted some freights to points in New Jersey and eastern Pennsylvania. Some have dropped from $4.90 to $4.62, while others have been advanced. Local yard prices on old material follow:

No. 1 heavy melting steel	$6.50 to $7.00
No. 1 railroad wrought	13.50 to 14.00
No. 1 yard wrought	11.50 to 12.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.00 to 7.50
Machine shop turnings	3.50 to 4.00
Cast iron borings, rolling mill	3.50 to 4.00
Cast iron borings, chemical	4.50 to 5.00
Heavy axle turnings	4.50 to 5.00
Blast furnace borings and turnings	3.00 to 3.50
Forged scrap and skeleton	6.00 to 6.50
Street car axles and shafting	17.00 to 18.00
Car wheels	19.00 to 20.00
Machinery cast	19.00 to 20.00
No. 2 cast	17.00 to 18.00
Stove plate	13.00 to 14.00
Railroad Malleable	13.00 to 13.50
Rerolling rails	10.00 to 11.00

St. Louis

ST. LOUIS, April 5.

Pig Iron.—There has been no change in prices from those which have been quoted recently, save that those prices seem to be a little better held. There are no new reports of resale iron in this market and such reports as have come out in the past have not been of any heavy quantities. The increasing activity of the stove interests as well as of the jobbing foundries is encouraging the trade. The local furnace on the west side has contracts, but is unable to get specifications. The furnace on the east side is running steadily and is now equipped for the delivery of hot iron to the east side industries ready to receive it.

Finished Iron and Steel.—No business is appearing in the mill lines represented in this section, although some small deliveries are being made on readjusted contracts as specifications are sent in thereon. Warehouse reports are of slightly improved business in the aggregate, but not of a total of any great moment except as an indication for the future. Some changes are reported in quotations.

For stock out of warehouse we quote as follows: Soft steel bars, 3.22½c.; iron bars, 3.22½c.; structural material, 3.32½c.; tank plate, 3.32½c.; No. 10 blue annealed sheets, 4.22½c.; No. 28 black sheets, cold rolled, one pass, 5.50c.; No. 28 galvanized sheets, black sheet gauge, 6.50c.

Coke.—There has been no new activity in coke, either Connellsville or other beehive oven coke, while the by-product plants show no change from the conditions previously reported. Prices remain about as last quoted, with the figures fairly well held.

Old Material.—The scrap market continues very dull, but at the prices which are being made the dealers are beginning to pick up some scrap to lay down in their yards and they are also turning over some small lots to consumers who have immediate need for the material. No large transactions are being entered into, however, by any melters. Railroad lists which are coming out as usual at this time of the month seem to evidence the needs of the roads for money, as the offerings are heavy with other lists in prospect. Included in the lists out so far, to close within the next few days, are the Pennsylvania, 6000 tons; Mobile and Ohio, 800 tons; Missouri, Kansas & Texas, 1000 tons; Cotton Belt, 600 tons. Other lists out but not closing at this point include the Chicago, Burlington & Quincy, Big Four and the Southern. The Frisco and the Wabash lists are expected out later in the week, while the Missouri Pacific continues to sell from day to day as accumulations develop and the market justifies without the formulation of any specific list for bids.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district, as follows:

Per Gross Ton

Old iron rails	$14.00 to $14.50
Old steel rails, rerolling	12.50 to 13.00
Old steel rails, less than 3 ft.	13.00 to 13.50
Relaying rails, standard section, subject to inspection	27.50 to 32.50
Old car wheels	12.50 to 13.00
No. 1 railroad heavy melting steel	12.00 to 12.50
Heavy shoveling steel	11.00 to 11.50
Ordinary shoveling steel	10.50 to 11.00
Frogs, switches and guards cut apart	12.00 to 12.50
Ordinary bundled sheet	5.00 to 5.50

Per Net Ton

Heavy axle and tire turnings	6.00 to 6.50
Iron angle bars	12.00 to 12.50
Steel angle bars	10.50 to 11.00
Iron car axles	25.00 to 25.50
Steel car axles	13.00 to 13.50
Wrought arch bars and transoms	14.00 to 14.50
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	9.00 to 9.50
Railroad springs	10.00 to 10.50
Steel couplers and knuckles	10.00 to 10.50
Locomotive tires, 42 in. and over, smooth inside	9.00 to 9.50
No. 1 dealers' forge	8.00 to 8.50
Cast iron borings	6.50 to 7.00
No. 1 busheling	11.00 to 11.50
No. 1 boilers, cut to sheets and rings	6.00 to 6.50
No. 1 railroad cast	12.50 to 13.00
Stove plate and light cast	11.00 to 11.50
Railroad malleable	10.00 to 10.50
Agricultural malleable	10.00 to 10.50
Pipes and flues	8.00 to 8.50
Railroad sheet and tank	5.00 to 5.50
Railroad grate bars	8.00 to 8.50
Machine shop turnings	4.50 to 5.00
Country mixed	7.00 to 7.50
Uncut railroad mixed	8.00 to 8.50
Horseshoes	11.00 to 11.50
Railroad brake shoes	8.00 to 8.50

Cincinnati

CINCINNATI, April 5.

Pig Iron.—The past week was probably the dullest experienced in the market for a year, even carload orders being few and far between. The only inquiry of any size came from the American Radiator Co. for 250 tons for its Springfield, Ohio, plant, which is expected to be taken to-day. As a result of competition from Valley furnaces which are now on a $25 base, some southern Ohio producers are willing to accept $26, Ironton, and several carloads have been disposed of on this basis. No transactions are reported in either Southern or Virginia irons, and quotations remain unchanged at $25 and $26 respectively. Silvery makers report releases of suspended tonnages from foundries allied with the automobile industry. The melt of iron in this district will be further curtailed as a result of the failure of employers and employees in Hamilton and Dayton to come to an agreement on the wage question. The old agreement expired on April 1, and all the union shops are now closed down, and will remain so until the wage situation is adjusted. In northern Indiana, however, increased operations are noted, some shops now running full time with reduced forces. The Portsmouth stack of the Whitaker-Glessner Co. is scheduled to resume on April 18, after having been banked since December. The Girard stack went out last week.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$29.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	30.75
Ohio silvery, 8 per cent sil	42.52
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	28.52
Basic, Northern	27.52
Malleable	28.52

Finished Material.—Orders for finished materials continue light, being confined almost exclusively to carload lots. Reports of 2.90c. on plain wire are heard, but very little business is being placed at any figure. On sheets, the usual range of prices quoted by independent mills is 3c. on blue annealed, 3.85c. on black and 4.75c. on galvanized. The demand for sheets is picking up slightly, and releases of suspended tonnages continue to come in. A fair demand for automobile body sheets is expected to develop within the next few weeks, as body manufacturers are reported to be steadily increasing their operations. Independents still quote 2c. on bars, shapes and plates, and some business has been placed at these figures. The structural market showed very little activity during the week. A high school building at Ironton, Ohio, involving 200 tons, is up for bids, and a theater building at Middlesboro, Ky., for the Brown Amusement Co., will likely be up within the next two weeks. A moving picture theater, to cost $250,000, is planned for Charleston, W. Va. No awards were reported.

Warehouse Business.—Local warehouses announced a reduction in prices effective March 31, on finished materials, with the exception of black and galvanized sheets, and wire products. Business is reported as slowly improving, particularly in lines connected with the automobile industry. New warehouse prices follow:

Iron and steel bars, 3.35c. base; hoops and bands, 4.05c. base; shapes, 3.45c.; plates, 3.45c. base; reinforcing bars, ¾-in. and larger, 3.42½c. base; cold rolled rounds, 1½ in. and larger, 4.85c.; under 1½ in. and flats, squares and hexagons, 5.35c.; No. 10 blue annealed sheets, 4.35c.; No. 28 black sheets, 6c.; No. 28 galvanized sheets, 7c.; wire nails, $3.75 per keg, base.

Plant Operations.—A slight increase in plant operations is noticed. The American Rolling Mill Co. at Middletown has placed another open hearth in operation, making three now active. The sheet mills of this company are running on a 40 per cent basis. The Andrews Steel Co. will operate its blooming and bar mills about 65 per cent this week, and the Newport Rolling Mill Co. will have a 70 per cent operation in its sheet mills. The sheet mills of the Whitaker-Glessner Co. at Portsmouth are running at 40 per cent of capacity.

Coke.—There is very little activity in the coke market. On the inquiry for 500 tons of furnace coke daily, noted last week, it is reported that a price of $3.60, Connellsville ovens, has been quoted. Occasional carloads are the only signs of activity, with prices unchanged from last week.

Old Material.—Mills in this district are not taking in any scrap and with most of the foundries closed, the market is very dull. Some of the larger dealers are buying mostly for yard stock and a purchase of 500 tons of railroad wrought at $10 a ton is reported. The Pennsylvania, Big Four and Erie are offering fairly heavy tonnages.

We quote dealers' buying prices:

Per Gross Ton		
Bundled sheets	$7.50 to	$8.50
Old iron rails	16.50 to	17.50
Relaying rails, 50 lb. and up	30.50 to	31.50
Rerolling steel rails	11.50 to	12.50
Heavy melting steel	10.00 to	11.00
Steel rails for melting	10.50 to	11.50
Car wheels	14.50 to	15.50
Per Net Ton		
No. 1 railroad wrought	10.00 to	11.00
Cast borings	5.50 to	6.00
Steel turnings	4.00 to	4.50
Railroad cast	13.50 to	14.50
No. 1 machinery	13.50 to	14.50
Burnt scrap	8.00 to	9.00
Iron axles	23.00 to	23.50
Locomotive tires (smooth inside)	10.50 to	11.50
Pipes and flues	7.50 to	8.00

Birmingham

BIRMINGHAM, ALA., April 5.

Pig Iron.—One iron maker reported "a world of small orders but no large ones" as the past week's business. He also shipped as much iron as one furnace made. The $25 base seems to have stood its ground fairly well, being shaded only in case of close competition. A lot of 200 tons for the Pacific Coast was lost on a competitive bid from Chinese iron, which, it is understood, has been offered at as low as $35 delivered. The rate from Birmingham, rail and water, via Mobile and the canal is $15.40, but even that shading of the rail rate of $23.08 would not permit the business. At the same time, a total of 200 tons of iron from the Sloss-Sheffield Steel & Iron Co. and Alabama Co. on prior orders left Mobile last week for the Pacific Coast. Some iron for Cuba is now being made by an Alabama interest, which has perfected special shipping arrangements with another interest. The Tennessee company continues to operate one stack on foundry, five on basic and one on ferromanganese. Large pipe makers have failed to even sound the market, but there is growing belief that something will come to the surface there soon. An unconfirmed report in trade circles is that these interests have been invited to make offer of large tonnages at reduced prices. The tendency to return to the fracture base is prevalent. The silicon differentials are losing their former strong position.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$25.00
Basic	24.00
Charcoal	40.00

Cast Iron Pipe.—Increase in building operations has caused resumption of eight to 10 soil pipe foundries. The Alabama Pipe & Fittings Co. and the Standard & Union Foundry Co. at Anniston resumed during the week. None is operating at normal, but the inquiry and sales are both considerably better. The water and gas pipe market is also looking up. The United States Cast Iron Pipe & Foundry Co. resumed at its Bessemer shop on 5-meter pipe this week both to make some stock and on new orders. Wage reductions of 12½ per cent have been inaugurated. Lower than base is quoted on actual business. Natchitoches, La., rejected bids on 1000 tons, but is expected in the market soon again.

Old Material.—The scrap market is extremely dull, although there is a somewhat improved demand for No. 1 cast. Steel is as dull as could be imagined.

We quote per gross ton f.o.b. Birmingham district yard, as follows:

Old steel rails	$13.00 to	$13.50
No. 1 heavy steel	12.50 to	13.00
No. 1 cast	18.00 to	19.00
Car wheels	18.00 to	19.00
Tramcar wheels	16.00 to	17.00
No. 1 wrought	15.00 to	16.00
Stove plate	12.00 to	12.50
Cast iron borings	5.00 to	6.00
Machine shop turnings	5.00 to	6.00

Philadelphia

PHILADELPHIA, April 5.

Steel trade cannot be said to be improving materially. There are a few more inquiries and for larger tonnages than have been usual in the past few months, but actual orders show little, if any, increase in aggregate tonnage. The best that can be said of the present situation is that there are a few indications that stocks of steel in the hands of consumers are being used up a bit more freely, especially for automobile work.

Most of the current steel inquiry of importance is plates for oil tanks and shapes and plates for building construction. The Standard Oil Co. of Indiana is inquiring for 5500 tons of plates for oil storage tanks at Casper, Wyo.; there are two inquiries from the Pittsburgh district, one of 2000 tons and another of 1800 tons, and 1000 tons of plates are required for pipe on which the City of Philadelphia took bids to-day. Several large structural jobs are being figured on, but mostly outside of this territory.

The pig iron market continues fairly quiet. The largest sale of the week was 2000 tons of No. 2 plain iron to a pipe maker at $24.50, Eastern furnace.

Some of the manufacturers of soil pipe have announced a reduction of $7 a ton.

Pig Iron.—Despite the fact that some Eastern sellers have actually raised their prices 50c. or $1 a ton, and are getting orders at the higher figures, the market continues soft, a sale of 2000 tons of No. 2 plain for April-May shipment having been made to a pipe maker at $24.50, furnace. No. 2 X iron is available at $25, furnace, and No. 1 X at $26, furnace. The spread of 50c. per ton between No. 2 plain and No. 2 X compares with a spread of $1.25, which was in effect during the war and for a considerable time thereafter. There have been no sales of basic during the week, but gray forge iron is available at $24, Eastern furnace. In some respects the pig iron market is more active; there are more inquiries and the tonnages specified are larger than the carload or 100-ton lots, which have characterized recent trading. There have been a number of sales of 500-ton lots. There is also a disposition on the part of some buyers to cover for 30 to 60 days ahead, whereas small lots for immediate shipment have been the rule. In the apparent determination of some furnace companies to resist further declines, sellers see some hope for slightly better prices. One company, which had gone as low as $25, base, furnace, on a few transactions, first increased its price to $25.50, then to $26 and again to $26.50, base, furnace, and has made small sales following each advance. Another furnace is holding several thousand tons of piled iron at $28, furnace, having refused all offers below this figure. One leading Virginia maker also asserts it will take no business below $28, furnace, though Virginia iron is to be had elsewhere at $26, furnace. Owing to the high freight rate, practically no Virginia iron is coming to this locality.

East. Pa. No. 2 plain, 1.75 to 2.25	$25.76 to $26.84
East. Pa. No. 2X, 2.25 to 2.75 sil.	26.26 to 27.84
Virginia No. 2 plain, 1.75 to 2.25 sil.	31.74 to 33.74
Virginia No. 2X, 2.25 to 2.75 sil.	32.99 to 34.99
Basic deliv. Eastern Pa.	25.00
Gray forge	25.26
Standard low phos. (f.o.b. furnace)	41.00
Malleable	29.90
Copper bearing low phos. (f.o.b. furnace)	40.00

Ferroalloys.—The only sales of ferromanganese reported are occasional carload lots at about $85, delivered, whereas producers are still quoting $90. Spiegeleisen is held by producers at $35, furnace, though resale lots have been sold close to $30.

Semi-Finished Steel.—A sale of 500 tons of open-hearth rerolling billets has been made by an Eastern steel company for shipment to an automobile company at $38.50, Pittsburgh. There is no demand for forging billets, but indications are that $41 or $42, Pittsburgh, would be quoted on a desirable tonnage.

Plates.—There is a dearth of plate orders, but inquiries have increased. Steel companies seem skeptical, however, as to whether the business in the market will be immediately placed. The Baldwin Locomotive Works is reported to have received an order for 50 locomotives from the Santa Fe Railroad, Lukens steel being specified. Thirty locomotives for China, ordered several months ago, and then held up, will now be built, it is stated. A local exporting company is figuring on 900 cars for China and upward of 100 for South America. Current orders for plates are being taken at 2c., Pittsburgh, though on very small lots higher prices have been obtained.

Structural Material.—A moderate improvement in bookings of structural shapes is noted, and prospects for further lettings of steel buildings appear fairly bright. Eastern steel companies are figuring on 10,700 tons of steel for two buildings in Cleveland, which may be let soon. In some cities there is considerable construction work being held up awaiting adjustment of labor costs to a lower basis. The Philadelphia Chamber of Commerce recently estimated, after a survey, that $150,000,000 worth of private and municipal work in Philadelphia is scheduled, though there is nothing definite as to when this business will become active. Structural shapes are available at 2c., Pittsburgh; small lots at 2.10c., Pittsburgh.

Bars.—Aside from a few small orders coming from the automobile producing district, the demand for steel bars is almost nil. Numerous construction jobs requiring concrete reinforcing bars are in prospect, however. On two lots for work in Detroit, one of 5000 tons and another of 3000 tons, it is stated that quotations below 2c., Pittsburgh, have been received. Eastern makers of bar iron are now willing to sell at 2c., Pittsburgh, a further decline of $2 a ton.

Sheets.—Such business as is being taken in sheets is at the expense of prices. Nominally the market may be quoted at 3c., for blue annealed, 3.85c. for black and 5c. for galvanized, base, Pittsburgh, but on desirable lots all of these prices have been shaded.

Bolts, Nuts and Rivets.—Eastern makers of bolts, nuts and rivets are expected to announce a 10 per cent cut in prices this week in line with prices quoted by some makers in the Central West.

Warehouse Business.—Further reductions on steel out of stock are noted this week. The prices below are for delivery in Philadelphia; for out-of-town shipment a reduction of $3 is made to cover shipping costs. We quote:

Soft steel bars and small shapes, 3.10c.; iron bars (except bands), 3.10c.; round edge iron, 3.75c.; round edge steel, iron finish, 1½ in. x ½ in., 3.75c.; round edge steel, planished, 4.50c.; tank steel plates, ¼-in. and heavier, 3.20c.; tank steel plates, 3/16-in., 3.75c.; blue annealed steel sheets, No. 10 gage, 4.10c.; light black steel sheets, No. 28 gage, 5.25c.; galvanized sheets, No. 28 gage, 6.50c.; square twisted and deformed steel bars, 3.55c.; structural shapes, 3.20c.; diamond pattern plates, 5.50c.; spring steel, 5.00c.; round cold-rolled steel, 4.60c.; squares and hexagons, cold-rolled steel, 5.10c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to 3/16-in. inclusive, 3.80c.; iron bands, 4.75c.; rails, 3.45c.; tool steel, 16c.; Norway iron, 10c.; toe steel, 4.50c.

Old Material.—Prices of all grades of scrap have dropped so low that only forced sales are being made. One Eastern steel plant offers only $11.50 for No. 1 heavy melting steel. Machine shop turnings have been sold at $8.50 to $9; stove plate at $14 to $14.50; pipe at $13 to $14. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Steel rails, rerolling	17.00 to 18.00
No. 1 low phos., heavy 0.04 and under	19.00 to 20.00
Car wheels	18.00 to 19.00
No. 1 railroad wrought	17.00 to 18.00
No. 1 yard wrought	15.50 to 16.00
No. 1 forge fire	11.50 to 12.00
Bundled skeleton	8.50 to 9.00
No. 1 busheling	13.50 to 14.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.50 to 9.00
Mixed borings and turnings (for blast furnace use)	8.50 to 9.00
Machine-shop turnings (for rolling mill and steel works use)	8.50 to 9.00
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for rolling mills)	9.00 to 9.50
Cast borings (for chemical plants)	11.00 to 12.00
No. 1 cast	18.00 to 19.00
Railroad grate bars	15.00 to 16.00
Stove plate (for steel plant use)	14.00 to 14.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 14.00
Iron car axles	No market
Steel car axles	No market

Buffalo

BUFFALO, April 5.

Pig Iron.—This market may be said to have improved within the week. One interest has found it worth while to start another blast furnace and another interest plans to start an open-hearth within a few days. Inquiry of more than 4000 tons of pig iron is reported by one company, one of the requests for prices being for 3600 tons. The same company sold 600 tons last week. The price was not divulged nor was it stated what prices were quoted on the inquiries. A sales agency sold three small consignments, one being a quantity of No. 2 plain, which sold at $28. The same agency has total inquiries for 3000 tons. A company which has steadfastly adhered to the $30 base price and has done little business reports total sales of 600 tons at its figure. It reports total inquiry of 6000 tons for the week. The same seller sold a small lot of No. 2X at $27 and No. 1, 2.75 to 3.25 silicon, at $27.50.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$27.50 to $28.50
No. 2X foundry, 2.25 to 2.75 sil.	27.00 to 28.00
No. 2 plain, 1.75 to 2.25 sil.	26.00 to 27.00
Basic (nominal)	26.00 to 27.00
Malleable (nominal)	27.00 to 28.00
Lake Superior charcoal	38.00

Finished Iron and Steel.—The month of March showed decided improvement in the volume of business over the preceding month. Inquiry brightened perceptibly. Almost without exception, inquiry is reported better. Several mill interests report a movement of material from stock which was contracted for months ago. This refers particularly to sheet business and has been traced to the so-called revival in the automobile trade. An allotment of approximately 1000 tons of plates and shapes was sold by a Canadian producer at 2c. for delivery to the Hydro-Electric Power Co. of Ontario. The ruling bar price on carload lots and less is 2.10c., and on tin plate the price is $7. Pipe prices are still on the old schedule. A bar mill which has been down for several months is now going with sufficient tonnage in sight to keep busy for a month. The wire business of one interest continues good. Several large inquiries reported last week have not been closed. Export inquiry for sheets of light gages is reported brisk. There is a difference of opinion with respect to the automobile market. A local sheet interest, after a survey among Detroit manufacturers, says the sudden activity is not stable and will be of short duration. Still another interest is hopeful of this industry and traces the growing demand for sheets to this source. This same interest reports a number of small orders. A local structural interest is low bidder on a job involving 900 tons for use in the new Hancock Building, a 12-story structure to be erected in Syracuse.

We quote jobbers' prices f.o.b. Buffalo as follows: Structural shapes, 3.25c.; plates 3.25c.; plates No. 8 gage, 4.10c.; soft steel bars and shapes, 3.15c.; hoops, 3.85c.; blue annealed sheets, No. 10 gage, 4.15c.; galvanized steel sheets No. 28 gage, 6.30c.; black sheets, No. 28 gage, 5.30c.; No. 9 gage annealed wire, 4.35c.; cold rolled strip steel, 8.15c.

Warehouse Business.—Prices have been reduced again. Business is better and inquiry is coming in from customers who have been out of the market for some months. A local warehouse is maintaining a price schedule for customers in western and central New York and northern Pennsylvania which will meet the delivered prices of Pittsburgh warehouses.

Old Material.—One interest has purchased a lot of 600 tons of heavy melting steel at $10. The purchase is said to be direct from the producer. A larger output of turnings is on the market, due to the activity of automobile interests. Dealers report no increase in trade.

We quote dealers' asking prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$11.50 to $12.50
Hydraulic compressed	10.00 to 11.00
Low phos., 0.04 and under	18.00 to 19.00
No. 1 railroad wrought	16.00 to 17.00
Car wheels	18.00 to 19.00
Railroad malleable	12.50 to 13.50
Machine shop turnings	8.00 to 9.00
Heavy axle turnings	11.00 to 12.00
Clean cast borings	8.00 to 9.00
Locomotive grate bars	11.50 to 12.50
Wrought pipe	10.50 to 11.50
No. 1 busheling	9.50 to 10.50
Stove plate	18.00 to 19.00
Bundled sheet stampings	7.00 to 8.00

San Francisco

SAN FRANCISCO, March 30.

Pig Iron.—There is not a great deal of outstanding interest to report for the past week or two, the same general depressed condition prevailing, with a weak tendency in the market, probably accentuated by the recent offering of some Chinese foundry at $38, delivered. Sales have been few and far between and almost entirely confined to small lots for particular needs. With foundries well supplied and operating at about 25 per cent of capacity, prospects for an early revival in the Coast pig iron market do not appear very encouraging. A local interest received an inquiry for a quantity of No. 2 foundry, which was offered at $25.50, furnace, but even this price did not prove attractive. The import situation shows little activity.

Coke.—What has been said of pig iron applies in a general way to this market. Conditions are practically unchanged, except perhaps that business is a little quieter than before, no sales of note being reported during the past two weeks, and just a narrow, routine business being done. The market is estimated at about $23 net ton, delivered, San Francisco, but does not present a stable appearance.

Old Material.—The Coast market has continued dull and uninteresting, with weakness apparent in all offerings. Because of the lack of activity there is considerable variation in opinions of the market level, ideas ranging from about $12 to $13 on heavy melting steel, gross ton delivered at the mill, but the lower quotation seems to be more in line for carload quantities. Cast iron scrap is quoted at about $30. There are no signs for an immediate recovery in mill activity.

Cast Iron Pipe.—Business has been quieter, although some activity in certain parts of the State continues. The market is still quoted at $55 base per ton, Birmingham. Buyers are keeping stocks low. No new shipments to the Coast have been reported. It is not expected that the reduction in transcontinental freight rates to $30, which becomes effective April 5, will affect water transportation via the Panama Canal, since this railroad concession is not sufficient to offer any competition.

Finished Iron and Steel.—The market is still quiet and unsettled, but there are indications that point to a better future. Inquiries, on the whole, have been received in larger volume and more actual sales, involving small lots for the most part, have been consummated during the past fortnight. Jobbers' stocks are low and some replenishment has been made, but not in large quantities. Among other prospects in sight is the Don Pedro dam at Turlock, Cal., involving about 500 tons of reinforcing bars. An instance of continued market instability was afforded last week when a local interest contracted to sell 2000 tons of reinforcing steel at $2.45 base, which compares with the more generally accepted price of about $3 mill. Some mills, however, are showing a tendency to hold for the market price in an effort to stabilize conditions. Plain bars appear firmer at $3.40 mill. Weakness in the steel market was also responsible for a difference of over $92,000 between the official estimate of the California Highway Commission and the lowest formal bid, submitted a few days ago by the Healy-Tibbits Construction Co., San Francisco, for the construction of the proposed new steel bridge over the Feather River at Oroville, Cal. The commission's estimate was $249,719.25 and the low bid $157,647.50. Export inquiries have shown an increase—two for 280 and 310 tons of merchant bars—but the Orient still remains a disrupted and unsatisfactory market. It was reported that approximately 125 tons of structural steel from Belgium have been delivered on the Coast at $2.75 per hundred, or about $20 per ton cheaper than domestic. Plates and sheets have displayed a weakening tendency, and the price is adjusted practically to the nature of the specification. Sheets are quoted at about 4.75c., base, and plates around 2c., Pittsburgh. Practically the only item of interest is a contract involving approximately 1700 tons of plates and shapes, on which the shipyards are at present figuring. Bids will open early in April.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.695
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.78
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.33	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.78		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 70c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, $1.20; pipe, not over 8 in. in diameter, 85c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2c. to 2.45c.

Wire Products

Wire nails, $3.00 to $3.25 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50 and shorter than 1 in., $2; bright Bessemer and basic wire, $3.00 to $3.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.00 to $3.25; galvanized wire, $3.45 to $3.95; galvanized barbed wire, $3.60 to $4.10; galvanized fence staples, $3.85 to $4.10; painted barbed wire, $3.15 to $3.40; polished fence staples, $3.15 to $3.40; cement-coated nails, per count keg, $2.60 to $2.85; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 58 to 63 per cent off list for carload lots, 57 to 62 per cent for 1000-rod lots, and 56 to 61 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$3.70
Large boiler rivets.....3.80
Small rivets .....60, 10 and 10 per cent off list
Small machine bolts, rolled threads, 60, 10 and 10 per cent off list
Same sizes in cut threads.....60 and 10 per cent off list
Longer and larger sizes of machine bolts....60 per cent off list
Carriage bolts, ⅝-in. x 6-in.:
Smaller and shorter, rolled threads.....60 per cent off list
Cut threads .....50 and 10 per cent off list
Longer and larger sizes.....50 and 10 per cent off list
Lag bolts .....65 per cent off list
Plow bolts Nos. 1, 2 and 3 head....50, 10 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts ⅝-in. x 4-in.:
Smaller and shorter.....45, 10 and 10 per cent off list
Longer and larger sizes.....40, 10 and 5 per cent off list
Hot pressed sq. or hex. blank nuts.....$3.25 off list
Hot pressed nuts, tapped.....$3.00 off list
C. p. c. and t. sq. or hex. nuts, blank.....$3.10 off list
C. p. c. and t. sq. or hex. nuts, tapped.....$2.85 off list
Semi-finished hex. nuts:
¼ to 9/16 in. inclusive U. S. S.....80 per cent off list
Same sizes S. A. E.....80 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E., 70 and 10 per cent off list
Stove bolts in packages.....75, 10 and 12½ per cent off list
Stove bolts in bulk.....75, 10 and 10 per cent off list
Tire bolts .....60, 10 and 10 per cent off list
Track bolts .....4.90c. base

Square and Hex. Head Cap Screws

½ in. and under.....65 and 10 to 70 per cent off list
9/16 in. to ¾ in.....65 to 70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....65 and 10 to 70 per cent off list

One cent per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size, or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $52 to $57; chain rods, $52 to $57; screw stock rods, $57 to $62; rivet and bolt rods and other rods of that character $52 to $57; high carbon rods, $62 to $75, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $3.25 to $3.65 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $4.25 to $4.50; 5/16-in., $5 to $5.25. Boat and barge spikes, $4.25 to $4.50 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4.90 base per keg of 200 lb. Tie plates, $2.50 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $13.80 per package; 8-lb. coating, I. C., $14.10; 12-lb. coating, I. C., $15.80; 15-lb. coating I. C., $16.80; 20-lb. coating, I. C., $18.05; 25-lb. coating, I. C., $19.30; 30-lb. coating, I. C., $20.30; 35-lb. coating, I. C., $21.30; 40-lb. coating, I. C., $22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2c. to 2.35c. from mill. Refined bar iron, 2.75c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	50½	24	⅜	15½	+11½
½	54½	40	½	24½	6½
¾ to 3	57½	44	¾ to 1½	29½	13½

Lap Weld

2	50½	38	2 to 2½	25½	11½
2½ to 6	53½	41	3 to 6	27½	14½
7 to 12	50½	37	7 to 12	24½	11½
13 and 14	41				
15	38½				

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	46½	29	¼	+13½	+46½
½	51½	39	⅜	13½	+ 3½
¾ to 1½	55½	43	½	23½	10½
2 to 3	56½	44	¾ to 1½	29½	14½

Lap Weld, extra strong, plain ends

2	48½	37	2 to 2½	26½	13½
2½ to 4	51½	40	3 to 4	28½	16½
4½ to 6	50½	39	4½ to 6	27½	15½
7 to 8	46½	33	7 to 8	19½	7½
9 to 12	41½	28	9 to 12	14½	2½

To the large jobbing trade an additional 1, 5 and 2½ per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ to 2 in.	19½	1¾ to 1⅞ in.	+10
2¼ in.	24	2 in.	List
2½ to 3¼ in.	30½	2¼ in.	—2
3½ to 4½ in.	40½	2½ in.	—6
		2¾ to 3¼ in.	—7
		3½ to 4½ in.	—12

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton		Per Net Ton	
1 in.	$327	1¾ in.	$207
1¼ in.	267	2 to 2½ in.	177
1⅜ in.	257	2¾ and 3¾ in.	167
1½ in.	207	4 in.	187
		4½ to 5 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department which will be subject to special negotiations.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.95 to 3.45	Nos. 11 and 12	3.05 to 3.60
Nos. 9 and 10 (base)	3.00 to 3.55	Nos. 13 and 14	3.10 to 3.65
		Nos. 15 and 16	3.20 to 3.75

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	3.50 to 4.15	No. 28 (base)	3.75 to 4.35
Nos. 22 to 24	3.60 to 4.20	No. 29	3.85 to 4.45
Nos. 25 and 26	3.65 to 4.25	No. 30	3.95 to 4.55
No. 27	3.70 to 4.30		

Galvanized Black Sheet Gage

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.75 to 4.70	Nos. 25 and 26	4.45 to 5.40
Nos. 12 to 14	3.85 to 4.80	No. 27	4.60 to 5.55
Nos. 15 and 16	4.00 to 4.95	No. 28 (base)	4.75 to 5.70
Nos. 17 to 21	4.15 to 5.15	No. 29	5.00 to 5.90
Nos. 22 to 24	4.30 to 5.25	No. 30	5.25 to 6.20

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	3.80 to 4.15	No. 28 (base)	4.00 to 4.35
Nos. 17 to 21	3.85 to 4.20	No. 29	4.05 to 4.40
Nos. 22 to 24	3.90 to 4.25	No. 30	4.05 to 4.40
Nos. 25 to 27	3.95 to 4.30	Nos. 30½ and 31	4.10 to 4.45

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
March	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
30.....	13.00	12.62½	29.25	4.40	4.12½	5.15	4.65
31.....	13.00	12.62½	29.00	4.40	4.12½	5.15	4.65
April							
1.....	13.00	12.75	29.00	4.40	4.12½	5.15	4.65
2.....	13.00	12.75	....	4.40	4.12½	5.15	4.65
4.....	12.75	12.50	28.25	4.25	4.25	5.15	4.65
5.....	12.75	12.50	28.50	4.25	4.25	5.15	4.65

NEW YORK, April 5.

There is no marked improvement in demand for any of the metals and price changes are not important. While the copper market is a little firmer, consuming demand is not any larger. The tin market is inactive, with prices largely nominal and but slightly changed. Lead is the strongest of the markets, being scarce and slightly higher. There is no change in the demand for or price of zinc.

New York

Copper.—During the week there was a temporary increase in inquiry and a slight betterment in buying, probably as a result of the drastic shutdown of producing companies, noted last week. This slight improvement, however, has fallen off and the market, if anything, is as quiet as ever and slightly lower. Some sales have been made as high as 13c., delivered, but electrolytic copper is now obtainable as low as 12.50c., New York, or 12.75c., delivered, which we quote as the market and which is the minimum. Lake copper is sympathetically weaker at 12.75c., delivered. These quotations apply to delivery through April and May, with quotations for June slightly higher.

Copper Averages.—The average price of Lake copper for the month of March, based on daily quotations in the IRON AGE, was 12.54c. The average price of electrolytic copper was 12.19c.

Tin.—The market has been dull, but the tone fairly firm. There has been a fair inquiry, but sellers are not anxious for orders. There were no sales on the New York Metal Exchange until yesterday, when 25 tons of Straits tin, March-April shipment from the East, was sold at 29c. Other sales of Eastern shipment in small volume were also made at 29c., and there were buyers of future tin at 28.75c., with sellers at 29c. to 29.25c. While the market here is not yet affected by the coal strike in England, it is likely that it will be if the trouble there continues. London prices to-day were £152 10s. for spot standard, £156 5s. for future standard, and £160 10s. for spot Straits, these prices being £9 per ton lower than a week ago in the case of standard tin and £7 in the case of spot Straits. In New York spot Straits was quoted to-day at 28.50c., the price during the week hovering around 28.25c. to 29.25c. Delivery of tin into consumption during March was 1683 tons, with the quantity in stocks and landing on March 31 reported as 3476 tons. Imports for the first quarter this year were only 5443 tons as compared with 13,650 tons a year ago. The quantity afloat is reported as 1090 tons.

Lead.—The market is strong but quiet and lead is in scant supply. Late on Thursday, March 31, the leading producer again advanced its price from 4.10c. to 4.25c., both New York and St. Louis, the outside market having already exceeded this level. Up until yesterday the light demand was being satisfied by independent sellers, but there were evidences early this week that the leading producer was taking business at its new quotation. We therefore quote the market at 4.25c., New York and St. Louis, for early delivery.

Zinc.—The market continues in its passive state, with demand confined to carload lots and quantities up to 200 tons for early delivery, the total volume being light. Most of the business for prime Western has been taken at 4.65c., St. Louis, or 5.15c., New York, for early delivery. Buying is confined to the hand-to-mouth needs of a few brass and galvanized sheet producers.

Antimony.—Wholesale lots for early delivery are quoted at 5.12½c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted by the leading producer at 28c., f.o.b. plant, and the same grade from other sellers is quoted at 23c. to 23.50c., New York.

Old Metals.—The market continues firm and while there is a little business, there is not the activity desired. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	11.50
Copper, light and bottoms	9.75
Heavy machine composition	12.00
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.25
No. 1 yellow rod brass turnings	6.00
Lead, heavy	4.00
Lead, tea	3.00
Zinc	3.50

Chicago

APRIL 5.—The complete shutdown of smelters has strengthened copper, while the advance by the leading lead producer has given that metal greater firmness. On the other hand, the English coal strike has weakened tin. On the whole, the market has undergone little change in the absence of active demand. Old metal quotations remain the same. We quote Lake copper at 13c. in carload lots; tin, 31c. to 32c.; lead, 4.50c.; spelter, 4.75c. to 4.90c.; antimony, 7.50c. On old metals we quote copper wires, crucible shapes, 8c.; copper clips, 8c.; copper bottoms, 7c.; red brass, 8c.; yellow brass, 5.50c.; lead pipe, 2.75c.; zinc, 2c.; pewter, No. 1, 17c.; tinfoil, 19c.; block tin, 22c., all these being buying prices for less than carload lots.

St. Louis

APRIL 4.—The non-ferrous markets have been quiet, although lead has been a little stronger. In car lots lead is quoted at 4.35c. and spelter 4.65c. In less than car lots the quotations are: Lead, 4.75c.; spelter, 5.25c.; tin, 33c.; copper, 13.75c.; antimony, 7c. In the Joplin district ores have been in light demand, although lead has improved somewhat in sympathy with the stiffening of metal. Zinc blende is selling, basis 60 per cent, at $20 to $22.50 per ton, and lead at $40 to $42.50 per ton, basis 80 per cent. Calamine continues out of the market as the deposits cannot be worked profitably at present prices. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 4c.; heavy yellow brass, 6.50c.; heavy red brass, light copper, heavy copper and copper wire, 9c.; pewter, 13c.; tinfoil, 20c.; aluminum, 10c.; zinc, 3c.; lead, 3.50c.; tea lead, 2c.

Malcolm J. McLeod, Michigan manager for the David Lupton's Sons Co., Philadelphia, announces that the Michigan business of the company has grown large enough to necessitate the erection of new warehouses. The company will lease 40,000 sq. ft. of space soon, to serve until new buildings can be erected. The new building now contemplated will be 200 x 200 ft., one story. The Lupton company manufactures steel window and factory sash, steel shelving and other factory equipment. It has just finished putting in steel sash at the Ford foundry and power house in River Rouge, Mich.

E. L. Ford, president Youngstown Steel Co., Youngstown, Ohio, announces that construction of the proposed plant on a site at Warren, Ohio, has been indefinitely postponed owing to uncertain business conditions and price unsettlements. The company plans to erect a plant for the production of puddled iron by a mechanical process patented by Mr. Ford after years of study and research. The inventor is a director of the Youngstown Sheet & Tube Co. and a member of the executive committee of the Brier Hill Steel Co.

PERSONAL

Chairman Gary of the United States Steel Corporation arrived in Chicago Tuesday and will probably arrive in New York Saturday, but is not expected at his office before Monday.

E. G. Motheral, formerly of Betts-Pierce Co., Cleveland, and Anderson & Co., Pittsburgh, has associated with the Duquesne Steel Products Co., Oliver Building, Pittsburgh, Pittsburgh district representative of the Superior Sheet Steel Co., Canton, Ohio.

At the last meeting of the board of directors of F. J. Ryan & Co., Franklin Trust Building, Philadelphia, specialists in electro-thermic engineering, the following elections to the board took place: W. W. Posey, president Lancaster Iron Works, was elected a director. A. C. Sculley, secretary and treasurer Lancaster Iron Works, was elected a director and treasurer. With the facilities of the Lancaster Iron Works for manufacturing puposes, it is now possible for F. J. Ryan & Co. to design, manufacture, erect and install all of their products entirely within their own organization.

Frank H. Willard, vice-president and general manager Graton & Knight Mfg. Co., Worcester, Mass., belting, has been made chairman of the transportation committee, Traffic Bureau, Worcester Chamber of Commerce.

W. F. Pollock has been made president of the Victor & Napier Saw Works, Springfield, Mass., to succeed Frank N. Baldwin. G. W. Donahue, also of Springfield, has been made vice-president.

Frederick S. Lust, Lust & Co., 220 Broadway, exporter of iron and steel, has disposed of his controlling interest in the company to F. C. Zehrmann. The company will continue under its present name for nine months. Mr. Lust will leave shortly for a European business trip of a few months.

Harry O. Price, who has been affiliated with the National Sales & Trading Co., Cleveland, and has been in charge of the Pittsburgh office of that company, has disposed of his interests in the company. The National Sales & Trading Co. discontinued its Pittsburgh office as of April 1, and Mr. Price will occupy the office and continue in the same business for himself.

R. B. Wallace, Bethlehem Steel Co., Boston, was elected dictator of the New England Iron League at its annual meeting for election of officers for the ensuing year, held at the Boston Athletic Association Thursday evening, March 31. Mr. Wallace succeeds W. O. Russ, Eastern Steel Co., Boston, who automatically becomes a member of the "kitchen cabinet." C. H. Carter, Midvale Steel & Ordnance Co., Boston, was re-elected treasurer. The kitchen cabinet now consists of W. O. Russ; W. S. Locke, Carnegie Steel Co.; H. W. Hayes, Midvale Steel & Ordance Co.; W. B. Douglas and C. N. Fitts, New England Structural Steel Co.; H. A. Jackson, Chicago Pneumatic Tool Co.; M. F. Brown, Boston Bridge Works; C. H. Carter, Midvale Steel & Ordance Co.; H. L. Stevens, Lackawanna Steel Co.; J. G. Andrews, Boston Bridge Works; A. C. Harvey, A. C. Harvey & Co., and F. W. Brigham, Bethlehem Steel Co., all, with the exception of Mr. Jackson, of Boston.

Dr. R. S. MacElwee has resigned, effective April 1, as director of the Bureau of Foreign and Domestic Commerce, Department of Commerce, to accept the position of director of the school of foreign service of Georgetown University, Washington, D. C. His successor has not been named.

George E. Otte, 1836 Scranton Road, Cleveland, has been appointed by the Commercial Forgings Co., hammered forgings, 3709 East Ninety-first Street, Cleveland, as representative for sales for Ohio, with the exception of Cleveland. Charles A. Morren, 79 West Monroe Street, Chicago, has been made representative for Illinois and Wisconsin.

F. F. Beall, vice-president of manufacturing, Packard Motor Car Co., Detroit; Earl H. Browning, vice-president Machine Products Co., Cleveland; Earle Buckingham, engineer of standards, Niles-Bement-Pond Co., New York; Maynard D. Church, chief engineer Terry Steam Turbine Co., Hartford, and John P. Kottcamp, Pratt Institute, Brooklyn, have been appointed members of the committee for the standardization of gears, joining with representatives of the American Gear Manufacturers' Association for drawing up a standard for the American Engineering Standards Committee.

C. W. Leister, for 19 years with the McClintic-Marshall Co., has formed the C. W. Leister Machinery Co., 829 Commercial Trust Building, Philadelphia, to sell portable belt conveyors, elevators, crushers and pulverizing and screening machinery. With the McClintic-Marshall Co. he served four years at Pottstown, seven at Chicago and eight years at Pittsburgh in the capacities of chief draughtsman and plant engineer.

Clement F. Poppleton, who has had a wide experience in sheet and tin plate mill installations, has located in Pittsburgh and will engage in the practice of consulting engineering. Temporarily he is located at Hotel Schaffer, Duquesne Way, Pittsburgh.

Howard E. Nettleton, formerly attached to the Minneapolis office of Mark Mfg. Co. and the Steel Tube Co. of America, recently was transferred to the Pittsburgh office of these companies and has assumed his new duties.

Dr. Ernest Fox Nichols, formerly president of Dartmouth College, Hanover, N. H., and for the last year director of physical research at the Nola Park Laboratory, National Electric Lamp Association, Cleveland, has been elected president of the Massachusetts Institute of Technology, Cambridge, Mass., to succeed the late Dr. Richard C. MacLaurin.

Charles L. Smith, for a number of years Cincinnati editorial representative of THE IRON AGE, and later connected with the Vanadium Alloys Steel Co. as Cincinnati district sales manager, removed recently to El Paso, Tex., and has become sales manager of the Moore Iron Works, Inc., that city. The company is engaged in iron and steel structural and wire work and manufactures a variety of products.

J. B. Crane has been appointed to the sales and engineering department of the George T. Ladd Co., manufacturer of water tube boilers. He has had over 15 years' experience in the construction and operation of power houses.

Fred C. Hermann, for the past year identified with the Chicago store of the Reed-Prentice Co., the Becker Milling Machine Co. and the Whitcomb-Blaisdell Machine Tool Co., has been appointed sales representative in Chicago and vicinity for the Dale Machinery Co., 541 West Washington Street, Chicago. E. L. Beisel, formerly Chicago representative of the Gardner Machine Co., has been made sales representative for the Dale Machinery Co. in Milwaukee territory.

G. F. Danielson, formerly of the Truscon Steel Co., Youngstown, Ohio, has assumed his duties with the Commercial Shearing & Stamping Co., Youngstown, in charge of the company's new plant.

Robert B. M. Wilson has been appointed sales engineer of the Chicago district for the Conveyors Corporation of America, Chicago and New York. With him will be associated as an assistant, E. M. Wolfe.

C. E. Dinkey, who up to about a year ago was general superintendent of the Edgar Thomson Works, Carnegie Steel Co., has gone into the bond and security brokerage business, being president of the recently organized Morrison, Dinkey & Todd Co., which has opened offices in the Diamond Bank Building, Pittsburgh. Associated with Mr. Dinkey is R. G. Morrison, a nephew of the late Andrew Carnegie.

Henry Forker has been appointed general superintendent and elected treasurer of the Shenango Machine Co., Sharon, Pa.

A. P. Van Schaick has been appointed general manager of sales of the Page Steel & Wire Co., Grand Central Terminal, New York, succeeding E. C. Sattley, resigned; and W. T. Kyle is appointed assistant general manager of sales, both with headquarters at 1054 Grand Central Terminal, New York.

S. G. Porter, E. I. Porter and J. R. Richards have formed the Porter-Richards Machinery Co., 19 South Seventh Street, Philadelphia, to handle several lines of machine tools. The Messrs. Porter were formerly with the D. Nast Machinery Co., Philadelphia, and Mr. Richards was with the Fairbanks Co.

Charles M. Chamberlin, secretary and director A. M. Castle & Co., 715 North Morgan Street, Chicago, iron and steel, for the past 20 years, retired from all active business associations on April 1. Fred C. Conners succeeds him.

Lewis R. Smith, New York resident manager Matthew Addy Co. and president Collieries & Commerce Corporation, 27 William Street, leaves on April 7 on the Mauretania for Europe for a three months' visit. Part of his work at the New York office will be undertaken by W. H. Smith, newly elected vice-president of the Collieries & Commerce Corporation, formerly with the BonAir Coal & Iron Corporation, Nashville, Tenn.

Colin Cornwall, formerly with the Weirton Steel Co., has become associated with the Trumbull Steel Co.'s sales department, Grand Central Terminal, New York.

Herbert M. Boylston, head of the mining engineering department of the Case School of Applied Science, Cleveland, addressed members of the Engineers' Club, Youngstown district, March 31, on the subject "Metallography and Its Applications."

J. M. McComb, vice-president Crucible Steel Co. of America, who goes from Pittsburgh to New York as a result of the transfer of the general offices of the company, was tendered a farewell dinner by the directors of the Pittsburgh Association of Credit Men, at the Pittsburgh Athletic Club, April 2.

President James A. Campbell of the Youngstown Sheet & Tube Co., has returned to his desk at Youngstown, Ohio, after spending several months in Florida and at Hot Springs, Ark.

OBITUARY

Edmund C. Converse

EDMUND COGSWELL CONVERSE, New York financier, president of the National Tube Co. at the time of its merger into the United States Steel Corporation, and later a director of the corporation, died suddenly of a heart attack early April 4, while at a hotel in Pasadena, Cal., where he and his wife had been living since February. His home was in Greenwich, Conn., where he had an estate of 1500 acres, called Conyers Farm.

E. C. CONVERSE

Mr. Converse was born in Boston, Nov. 7, 1849, the son of James C. and Sarah Ann (Peabody) Converse. Following his graduation from the Boston Latin School in 1869, he entered the employ of the National Tube Works, founded by his father at McKeesport, Pa. Working his way through the mill, he finally became general manager of the company and upon the death of his father in 1893 succeeded to the presidency. In June, 1899, associated with William Nelson Cromwell, Mr. Converse merged the National Tube Works and 13 smaller companies into the National Tube Co., financed by J. P. Morgan & Co., and with a productive capacity of about 850,000 tons of tubing a year. Two years later, in 1901, on the formation of the United States Steel Corporation, which included the National Tube Co., he retired from active participation in the tube business, but remained a director of his company. He served as a director of the Steel Corporation from April 6, 1901, until March 28, 1916, when he resigned.

From 1901 on Mr. Converse gave his attention largely to banking, having been president of the Liberty National Bank, Bankers' Trust Co. and Astor Trust Co. He was also a director of the Guaranty Trust Co., Fidelity Phenix Insurance Co., International Nickel Co., of which he was chairman of the board; National Supply Co., American Bank Note Co., Coronet Phosphate Co., Kewanee Oil & Gas Co., Sheffield Iron Corporation, Texas & Pacific Coal Co., Inspiration Copper Co. and other companies.

In 1912 he endowed a chair of banking in the graduate school of business at Harvard University with a gift of $125,000, and in 1915 he gave $250,000 for a new library building at Amherst College.

JOHN J. KELLEHER, founder of the iron and steel scrap firm which bears his name with yards in Brooklyn and New York, died Saturday at the age of 76. He was in the scrap business for half a century and maintained one of the largest yards in Brooklyn.

ROBERT ALEXANDER BOLE, age 62, vice-president, director and district sales manager of Manning, Maxwell & Moore, Inc., New York, died April 2 in the Schenley Hotel, Pittsburgh, where he made his home. Mr. Bole was widely known in the iron, steel and railroad circles.. He was born in Old Allegheny City, and received his education in the Pittsburgh schools of the Fourth Ward. In early life he became identified with the Westinghouse Machine Co. and rose from the ranks to secretary. Following his long and faithful service with the Westinghouse interests, he became identified with the Niles-Bement-Pond Co. and later resigned to become associated with Manning, Maxwell & Moore, Inc. At the time of his death he had been identified with the latter company for 26 years. Mr. Bole enjoyed a very wide circle of business and personal friends throughout the East, especially in Pittsburgh and New York. His sterling qualities of integrity, justness and keen business judgment gained him great prominence in manufacturing and civic activities. At the time of his death he was a director of the Western National Bank of Pittsburgh and an active member of the Duquesne Club, Pittsburgh Athletic Association, Pittsburgh Country Club, Pennsylvania Society of New York and the Engineers' Club of New York. In his early life he was a member of the United Presbyterian Church and was later united with the North Presbyterian Church. Mr. Bole never married. A sister, Mrs. T. Charles Hare, survives.

R. A. BOLE

JOSEPH LYTHGOE, Pomfret, R. I., previous to his retirement in 1898 superintendent of the Rhode Island Locomotive Works, Providence, R. I., died March 29, after an illness of about a year and a half, at the age of 79 years. Mr. Lythgoe was born in Liverpool, Eng., July 14, 1841, and came to the United States when a youth, spending his boyhood in New Bedford and Taunton, Mass. He became associated with the Rhode Island Locomotive Works in the latter 60's, with whom he remained until 1880, when he went to the Sturtevant Blower Works, Jamaica Plain, Boston. Later, he was superintendent of the Rome Locomotive Works, Rome, N. Y.

Quick Action on Tariff Is Planned

(*Continued from page* 919)

turers have been received by correspondence and it is likely that a number of briefs will be filed by steel producers. It is said that President Eugene G. Grace of the Bethlehem Steel Corporation, upon invitation of the subcommittee, will appear before it this week. President J. A. Matthews of the Crucible Steel Co. is expected here today. Mr. Tilson stated that he was not at liberty to outline the nature of statements made by the steel people. Nor was it indicated whether there has as yet been any strong opposition to the proposal of the subcommittee, as announced by Mr. Tilson, to adhere closely to the Underwood-Simmons rates with regard to the heavier iron and steel lines. Rather, it has been intimated, the subcommittee has been getting views as to the technical and financial features of the iron and steel business and also proposals to reclassify groups in the metals schedule.

It nevertheless is believed that there will be objection from the steel trade to close adherence to Underwood-Simmons rates on the heavier lines in view of the high costs of manufacture both of raw materials and labor and indications of sharp competition from foreign countries whose production costs are said to be becoming progressively lower. It is the view of Mr. Tilson that in the heavier lines, where production is chiefly by machinery rather than man labor, the industry is so highly developed that it is not asking for any tariff and does not need any protection. Certainly this leads to the belief that Mr. Tilson is under a misapprehension, for the trade is known now to be showing concern over the possibilities of foreign competition that, it is feared, cannot be met successfully, particularly in the light of existing high costs of production and high freight rates.* But the opinion of Mr. Tilson is one that is general in Government circles. The view has been expressed that the maintenance of the Underwood-Simmons rates on the heavier lines is proposed merely as a source of revenue and not as a matter of protection, otherwise they could be transferred to the free list. Undoubtedly the trade itself is responsible for much of this attitude, for it showed relatively little interest at the tariff hearings. Whether it will retrieve itself before the subcommittee drafts the schedule or before the actual law is passed remains to be seen.

Protection for Finished Lines

Protection for the more highly finished lines, such as cutlery, clocks, tool steel, machine tools, etc., is held by Mr. Tilson to be necessary because of the great amount of labor involved. While these products admittedly do require more labor than the heavier lines, it has been pointed out that labor is the chief item of cost in making the latter.

It is reported, but not verified, that the subcommittee is considering suggestions of the Tariff Commission with regard to reclassifying groups in the metal schedule which the trade has said, as has also the commission, is necessary to bring it up to date with changing conditions. The commission divides the schedule roughly into four broad classes—machinery, hardware, other iron and steel, and nonferrous metals and minerals. Work on all these classes was pushed by the commission in the fiscal year 1919-1920 as much as possible and is being continued. About 145 new surveys were completed during the year. Of these about 75, previously reported, were revised more or less completely. It was declared to be a difficult undertaking to group the wide range of commodities that come under schedule C of the present law and involved a thorough study of the chemical, earthenware, and glassware and sundries schedules as well as the free list. It was pointed out that it is manifestly an almost endless task to prepare separate units on each of the thousands of commodities that may be classed as ores, metals, metal manufactures, and metallurgical products. Because of the rapid developments in certain industries since 1913, the year the Underwood-Simmons law became operative, new products, not specified in the present tariff, have come into prominence and require separate consideration. Moreover, it is stated, there are many products which, although specially provided for in the tariff, do not warrant individual treatment, some of them being practically obsolete. Reclassification problems were less serious in the nonferrous group and practically all these commodities were covered by surveys. With regard to machinery, it was held that certain types of special machinery, classified under "all other machinery" deserve separate treatment, including internal combustion engines, some textile machinery and electrical machinery.

*The effect of foreign exchange rates cannot safely be ignored. [Editor.]

Need for Reclassification

In no part of the tariff act has the need for systematic reclassification been more apparent, in the opinion of the commission, than in the case of the various finished and semi-finished products of iron and steel. These products are grouped in various paragraphs with no relation to the stage of manufacture, competitive position, or uses, the commission reported. Between 30 and 35 survey units are planned by the commission for this section, and of these 18 were completed and two were under way on July 1, 1920. In addition to these surveys and as a guide in their preparation, the commission said it is studying the possibility of a complete reclassification of the whole range of products commonly produced in steel works, and its suggestions along this line are said to be under consideration by the subcommittee.

The proposal of the commission is to follow the plan of grouping the products according to their degree of advancement, starting from pig iron as a base and showing the amount of labor, material, and fuel expended at each stage of production, cost statements from producers being used. A study of foreign tariffs on iron and steel, it was reported by the commission, disclosed so many anomalies in their tariff treatment that little assistance could be obtained from that quarter, although the French classification of alloy steels and certain paragraphs in the Canadian tariff are more definite than the distinctions in the present American tariff. Price differentials since the war have not been maintained, it is pointed out, with reference to production costs nor according to competitive conditions. The classification is further complicated by the matter of processes, and especially by the rapid growth in the use of alloy and other special steels since the tariff act of 1913 was framed. The increased use of the electric furnace in steel manufacture has introduced new factors not considered in previous tariff legislation.

In its study of ferroalloys, the commission said that the cost of electric power for electric furnaces is a large item in the total cost of manufacture.

Object to Coal and Coke Rates

WASHINGTON, April 5.—Rebuilding of the entire rate structure on coal and coke from the Connellsville, Pa., region to the Buffalo district is involved in complaints filed with the Interstate Commerce Commission by steel and other interests in that district. Among the complainants are the Lackawanna Steel Co., the Donner Steel Co. and Rogers, Brown & Co. It is claimed that the rates are unjust and unreasonable. The contention is made that the rates subsequent to the advances effective Aug. 26, 1920, should have been made without use of the rule for disposing of fractions permitted by the commission's decision in the rate advance of 25 per cent on June 25, 1918, by the Railroad Administration. The rule practically disregards cents per ton less than 5 cents and counts as 10 cents amounts above 5 cents.

The outstanding point of importance in the complaint, however, is that the existing rates are unreasonable and unjust.

The spring convention of the National Machine Tool Builders' Association, to be held in Atlantic City on May 19 and 20, as mentioned in THE IRON AGE of March 3, will be held at the Hotel Traymore.

IRON AND INDUSTRIAL STOCKS

Price Movements Fail to Reflect Improvement Noted in Various Industries

Reported improvement in various branches of industry was not reflected in prices for iron and industrial stocks the past week. Even automobile shares have averaged 3 to 5 points lower notwithstanding press reports of a comeback in this industry. Steel stocks showed greater softness than they have before in several weeks, with United States Steel common displaying relative steadiness. The distribution of the latter is greater than ever before in the history of that corporation, most owners holding as an investment, consequently the floating supply available for stock market manipulation is smaller. Selling of other steel shares of late was based on a lower range of steel product prices and the belief that the United States Steel Corporation within the near future will adjust prices. The more optimistic attitude of equipment company managements has failed to check selling of equipment stocks, such issues as Baldwin and American Locomotives averaging about 3 points lower.

The weakness of the securities market in general can be ascribed to the fresh liquidation in grains, leather and cotton, the prospect of railroad labor troubles this summer, the uncertainty over the tax revision situation, the inability of the carriers to meet fixed charges, the coal labor crisis in England and its possible influence on what little export demand there is, and chiefly to the fact that bank loans are not decreasing while deposits are ebbing, which signifies tighter rather than easier money conditions during early spring. Frozen credits largely account for bank loans not being reduced, while unemployment and the need of funds in small industrial centers, thereby necessitating the drawing down of "country" bank balances at the leading banking centers, account for sagging bank deposits.

The range of prices on active iron and industrial stocks from Saturday of last week to Monday of this week was as follows:

Allis-Chalm. com.	36¼- 38	Int. Har. pf.	106 -107
Allis-Chalm. pf..	81¼- 82½	Lack. Steel	51½- 54¼
Am. Can com...	28 - 30⅝	Midvale Steel ..	29 - 30
Am. Can pf.....	.. - 85	Nat.-Acme	23 - 24¼
Am. C. & F. com.	122¾-124⅝	Nat. E. & S. com.	59½- 61⅝
Am. C. & F. pf..	110¾-111	Nat. E. & S. pf.	.. - 94
Am. Loco. com..	85 - 88	N. Y. Air Brake	74 - 77¾
Am. Loco. pf....	105¾-106½	Nova Scotia Steel	38 - 39
Am. Rad. com...	70 - 70¼	Pressed Stl. com.	87 - 88¾
Am. S. F. com...	29¼- 30⅜	Pressed Stl. pf..	91⅞- 93⅞
Bald. Loco. com..	86⅜- 89⅝	Ry. Stl. S. com..	88 - 88½
Bald. Loco. pf...	.. -100	Replogle Steel ..	26½- 27¾
Beth. Steel com..	54¼- 55	Republic com....	64½- 68¼
Beth. Stl. Cl. B..	55 - 58½	Sloss com.	42 - 44
Beth. Stl. 8% pf.	104⅛-105⅛	Superior Steel...	39¼- 44¼
Chic. Pneu. Tool	63 - 64	Trans.-Williams..	38¾- 40⅝
Colo. Fuel	28 - 28¼	Un. Alloy Steel..	30¾- 31⅞
Cruc. Stl. com...	83¼- 90	U. S. Pipe com.	16½- 18⅛
Cruc. Steel pf...	84 - 88	U. S. Pipe pf....	.. - 48
Gen. Elec.	135¼-137⅞	U. S. Steel com.	80½- 82½
Gt. No. Ore Cert.	29¼- 32	U. S. Steel pf...	108¾-110¼
Gulf States Steel	32¼- 32¾	Vanadium Steel..	28¼- 31¾
Int. Har. com...	81 - 95¼	West'ghouse Elec.	47⅝- 49⅞

Canadian General Electric Prospering

That both the Canadian General Electric Company, Toronto, Ont., and its shareholders are in a particularly enviable position was made apparent at the annual meeting, held recently in Toronto. The consolidated balance sheet presented on that occasion showed the assets of the company to total $30,833,661, but President Frederic Nicholls pointed out that a recent conservative reappraisal of the properties of the company indicated them to possess a value of $12,500,000 in excess of the total on the books. As a result, the capital assets of the company, including land and buildings, machinery and tools, patterns and drawings, while nominally aggregating $14,752,057, were in reality worth in the neighborhood of $27,250,000. The total assets, representing in the statement as about $30,800,000, should actually be represented by a total of over $43,300,000.

In order to pay a 20 per cent bonus stock dividend as proposed by the directors, it will be necessary to increase the authorized capitalization from $10,000,000 to $20,000,000 and supplementary letters patent will be asked shortly with this object in view.

Mr. Nichols announced his decision to retire from the positions of president and general manager, both of which he has filled since the inception of the company a third of a century ago, but his services will be available still to his associates in the capacity of chairman of the board of directors. A. E. Dyment, the existing chairman of the board, was made president; Stephen Haas, one of the directors, was made vice-president; J. J. Ashworth, the assistant general manager, becomes general manager; J. A. Bremher, controller, is made assistant general manager.

Dividends at the rate of 8 per cent per annum and a bonus of 2 per cent were paid on the common stock during the fiscal year ending Dec. 31, 1920, and 7 per cent on the preference stock of the company, these two items combined calling for a distribution of $1,014,114.25

Good Showing of Graton & Knight Mfg. Co.

The annual meeting of the Graton & Knight Mfg. Co., Worcester, Mass., manufacturer of leather belting, brought out the fact that in spite of the slowing up of business in the final months of the year, 1920 was the best in the company's history. The report of President Walter M. Spaulding stated that since the low mark struck in December each month has been better than that preceding it.

The financial statement showed that late in 1920 $2,739,733 was charged off inventories, comprising manufactured products, goods in process and raw materials, values being computed at cost or market, whichever was lower, thus reducing inventory to $12,299,242. The balance sheet shows quick assets of $15,682,429 and current liabilities of $7,759,996. With the heavy charge off, the surplus was $3,929,862, a decrease of only $1,302,212. In the year dividends of approximately $790,000 were paid.

The election of officers resulted in no changes, excepting the addition to the board of directors of President John E. White of the Worcester Bank & Trust Co., trustee of the estate of Henry C. Graton, and F. W. Goodrich, general works manager. The officers follow: President, Walter M. Spaulding; vice-presidents, George T. Dewey, Frank H. Willard, L. L. Harr; treasurer, Henry C. Graton; assistant treasurer and secretary, W. Virgil Spaulding; comptroller, Henry G. Gould. These officers and Messrs. White and Goodrich constitute the directors.

Earnings Almost the Same

The earnings of the Harbison-Walker Refractories Co., Pittsburgh, for the year ended Dec. 31, 1920, were approximately the same as in the previous year, despite the fact that at no time during the year was the company able to operate in full because of irregular car supplies, the shortage of coal and the insufficiency and inexperience of labor. The statement makes the following comparison with that of 1919:

	1920	1919
Earnings	$5,009,041	$5,002,245
Repairs and taxes	1,289,255	1,931,335
Depreciation and depletion	849,791	866,546
Net earnings	2,869,996	866,546
Preferred dividends	495,538	576,000
Common dividends	1,242,049	2,160,000
Surplus for the year	1,132,409	378,477
Stock dividend on common	9,000,000	.....
Final surplus as per balance sheet	4,882,918	12,750,509

Orders for October, November and December were at the rate of 64 per cent, 42 per cent and 28 per cent respectively of capacity; for the months of January and February, 1921, at the average of 25 per cent of capacity, and while the company still is operating on a 45 per cent basis, this can continue only until the completion of the contracts in hand. Unless there is an upturn, it will be necessary to still further curtail output. As a rule the industry trails prosperity or depression in general business about six months, due to the fact that a large percentage of the business is new construction, which naturally does not begin until a healthy revival of business is well under way, and carries over a corresponding period of time when a depression sets in.

Winchester Repeating Arms Issues Bonds

The Winchester Repeating Arms Co., New Haven, Conn., has issued through Kidder, Peabody & Co., New York and Boston, $7,000,000 worth of 7½ per cent, first mortgage, 20-year gold bonds to repay current indebtedness. The bonds are issued under a closed first mortgage on the entire manufacturing plant at New Haven, including land, buildings and machinery. As the proceeds will be used to retire current bank loans, interest charges will not be increased by the issue. The Dec. 31, 1920, balance sheet of the company shows, after giving effect to the new financing, assets of over $14,000,000. The bonds are selling at 97½.

Industrial Finances.

A special meeting of the By-Products Coke Corporation has been called for April 15, to vote on increasing the stock of the company from $10,000,000 to $15,000,000, the new stock to be classified as preferred and to be entitled to receive dividends at the rate of 9 per cent yearly.

The special meeting of the Pressed Steel Car Co., Pittsburgh, to act on the proposed recapitalization plan which provides for the exchange of the outstanding preferred stock into a like amount of common stock and to approve of a 20 per cent stock dividend on the common stock, has again been adjourned, this time until March 30, owing to the inability of the management to secure the consent of the

holders of two-thirds of the outstanding preferred stock to the proposed plan.

The John Obenberger Forge Co., Milwaukee, Wis., manufacturer of drop forgings, has been made defendant in involuntary bankruptcy proceedings by three local creditors whose claims aggregate about $6,600. The liabilities are claimed to be approximately $800,000.

Statement of the Valley Mould & Iron Corporation, Sharpsville, Pa., for 1920, shows net income for the year, after allowing for depreciation, interest and taxes of $304,188, and dividends on preferred stock of $164,188. During 1920, the company retired $20,000 of first mortgage bonds, and $100,000 of purchase money serial gold bonds. Net working assets at the end of the year were reported at $2,016,579. The company's capital stock consists of $2,000,000 7 per cent cumulative preferred stock and 100,000 shares of non-par value common.

Owing to the decline in demand for flux stone, one of its principal products, the Bessemer Limestone & Cement Co., Youngstown, Ohio, omitted the regular dividend on its common stock for the first quarter of 1921. The company recently started its cement plant at Bessemer, Pa. Additional financing is being considered to meet obligations incurred by its extensions in this line.

The net profits of Fairbanks, Morse & Co., Chicago, for the year 1920 were $2,678,735, after providing for sinking fund, federal taxes and special inventory depreciation, the latter deduction being $1,650,000.

The B. J. Stamping Co., Toledo, Ohio, will increase its capital stock from $10,000 to $50,000 and change its name to the Bingham Stamping & Tool Co.

The Best Stove Co., Detroit, manufacturer of stoves, ranges, etc., has filed notice of change of name to the Best Stove & Stamping Co.

The D'Arcy Spring Co., Kalamazoo, Mich., has filed notice of increase in capital from $75,000 to $1,000,000.

The Connecticut senate has adopted a bill authorizing the Stanley Works, New Britain, Conn., to increase its capital without placing any limit on the amount, and another bill authorizing the Jewell Belting Co., Hartford, to increase its capital to $2,000,000 by an issue of preferred stock.

Counsel for the Groton Iron Works, Groton, Conn., recently announced the company is without funds and owes about $100,000, and is unable to meet the series notes falling due April 4, given a year ago to creditors when the plant, which receivers were operating, went back to the company.

Stockholders of the Pressed Steel Car Co., Pittsburgh, at an adjourned special meeting, March 30, approved an increase in authorized common stock from $12,500 000 to $50,000.000, the exchange of the $12,500,000 outstanding preferred stock for an equal amount of common stock and the declaration of a 20 per cent common stock dividend to be participated in by both common stockholders, and holders of preferred shares who convert their holdings into common. After the recapitalization is effected there will be only one class of stock, which will be common, the total authorized amount being $50,000,000, of which $20,000,000 will remain in the treasury for corporate purposes.

The consolidated 1920 earnings statement of the Greenfield Tap & Die Corporation, Greenfield, Mass., and the Lincoln Twist Drill Co., Taunton, Mass., shows gross sales of $6,203,767, contrasted with $4,793,209 in 1919. The net earnings, after allowances for depreciation, taxes and preferred dividends, were $666,965, or equivalent to $5.55 per share on the 120,000 common shares outstanding. The net earnings for 1919 were $721,557, or $48.10 a share on the $1,500,000 common stock then outstanding.

The net profits of the Timken-Detroit Axle Co. for 1920, after the reduction of inventories and provision for federal taxes, amounted to $712,508. The company's total assets at the close of the year were $21,494,863.

The Winchester Repeating Arms Co., New Haven, Conn., control of which is vested in the Winchester Co., the holding corporation, has increased its capitalization from $1 000,000 to $10,000,000. According to an official of the company the increased amount of stock does not represent any new capital or interest, but merely the division of the present capital investment into a greater number of shares.

Allegheny Steel & Tube Co., regular quarterly of 2 per cent on preferred stock payable April 6.

Wheeling Steel Corporation, dividend of 1 per cent on common stock, payable May 2, to stockholders of record April 15.

Superior Steel Corporation, quarterly of $1.50 on the common and $2 on the first and second preferred stocks, the common payable May 2 to record of April 15, and the preferred May 16 to record of May 2.

The Milwaukee Steel Foundry Co., 127 South Water Street, Milwaukee, has amended its corporate articles to provide for an increase in capitalization to $250,000, consisting of $100,000 of 8 per cent cumulative preferred and $150,000 of common shares. The new issue is made to finance extensions, general operations and provide more adequate working funds. Burton C. Wait is president.

The Haskell & Barker Car Co. earned net profits for the year ended Jan. 31, after charges and estimated Federal taxes, of $2,278,320, equal to $10.35 a share earned on the 220,000 shares of capital stock, of no par value, compared to $1,727,553, or $7.85 a share, earned in the preceding year. Surplus amounted to $1,398,320, against $847,553.

SHORT TRADE ITEMS

Pittsburgh district sales offices of the Brier Hill Steel Co., Youngstown, Ohio, have been opened in rooms 1912-1913-1914 Oliver Building, Pittsburgh, in charge of Robert C. Barton, district manager of sales.

Isaac Church, East Norwalk, Conn., will be known as the Isaac Church Expansion Bolt Co. after April 7.

The Velick Scrap Iron & Machinery Co., iron and steel scrap, Detroit, will open a new suite of offices in 404-406 Hanna Building, Cleveland, on April 15.

The Williamson Supply Co., Williamson, W. Va., has been organized to engage in the wholesale jobbers' mill, mine and electrical supply business. Officers are: T. F. Bailey, president; T. A. Palmer, vice-president and secretary; George W. Bishop, general manager and treasurer. Messrs. Bailey and Palmer are in charge of the Banks Supply Co., Huntington, and Mr. Bishop has been with the Superior Supply Co., Bluefield, W. Va., as assistant manager for the last 15 years. The company will have a paid-in capital of $150,000.

The Bourne-Fuller Co. removed its general offices on March 25 to the Hanna Building, Euclid Avenue and East Fourteenth Street, Cleveland. In these offices will be incorporated the sales, accounting and purchasing departments of the Upson Works (formerly the Upson Nut Co.), the Union Mills (formerly the Union Rolling Mill Co.), recently merged with the Bourne-Fuller Co.; also the executive offices of this company and its affiliated interests, the Bourne-Fuller Coke Co., the McComb Coal Co., and the Taylor Coal & Coke Co.

The Ames Iron Works, Oswego, N. Y., will establish direct branch sales and service offices at 1033-1035 Commercial Trust Building, Philadelphia, early in April, under the direction of E. A. Hahl and H. Schluter as district managers.

The Wheel Trueing Tool Co., importer of industrial diamonds and manufacturers of diamond pointed tools, with general offices in Detroit, has removed its Western office from the Wells Building, Milwaukee, Wis., to the branch office in the Great Northern Building, 20 Jackson Boulevard West, Chicago. William J. Sansom will be in Chicago at the new location. The change was effected April 1. Mr. Sansom has been representing the Western office for the past three years. Because of his former experience as night superintendent of the Milwaukee works of the International Harvester Corporation and prior to that, instructor of mechanical practice, University of Wisconsin, he is equipped to give service in grinding wheel trueing practice.

The S. K. F. Ball Bearing Co., Hartford, Conn., has arranged for a change in company name to the Skayef Ball Bearing Co.

The Chicago store of the Reed-Prentice Co., the Becker Milling Machine Co., and the Whitcomb-Blaisdell Machine Tool Co., at 26 North Clinton Street, will soon be closed and the sale of the Reed-Prentice and Becker lines will be taken over by the Dale Machinery Co., 541 West Washington Boulevard.

The Niles-Bement-Pond Co. and the Pratt & Whitney Co. will remove their Chicago store from the corner of Jefferson Street and Washington Boulevard to the northeast corner of Jefferson and Monroe streets about May 1.

The Morrison & Risman Co., jobber in new and relaying rails, accessories, with general office at Buffalo and district sales offices in the House Building, Pittsburgh, and 66 Broadway, New York, has just established an office at 778 Drexel Building, Philadelphia, with R. B. Morrison as district manager.

The Bonney Vise & Tool Works, Inc., Allentown, Pa., has changed its corporate title to Bonney Forge & Tool Works. Because of the large amount of drop-forge work done by the company the old name was not considered adequate.

Machinery Markets and News of the Works

PROSPECTS IMPROVING

Inquiry for Tools Better, Though Orders Are Still Few

Reinstatement of Old Orders by Automobile and Tire Manufacturers Gives Encouragement—More Price Reductions

With only a moderate increase in the volume of machine-tool business, there is, however, a continued improvement in inquiry. Among those most active are manufacturers of automobiles and parts, steam and hydroelectric generating equipment, textile and shoe machinery and oil well equipment. Many of the inquiries denote a desire to introduce more efficient and economical methods of manufacturing.

Reports from Detroit indicate a continued note of optimism, in spite of the fact that inquiries and orders show no increase. At Pittsburgh the market is showing more life, while at Cincinnati there is encouragement due to the reinstatement of some old orders by automobile and tire manufacturers. In New York, New England and Chicago territories, there is little or no change and business is quiet.

Prices are lower on lathes, radial drills, planers.

The National Tool & Mfg. Co., Tulsa, Okla., has inquired for about 70 machines for a new plant to manufacture oil well equipment. The Insulite Co., Ellenboro, W. Va., a new company organized to manufacture hard rubber substitutes, is asking for bids by April 15 on a list of machine-shop and power plant equipment. Its factory building is now under construction. The Wheeling Steel Corporation has voted $3,000,000 for additions and improvements at its Steubenville, Ohio, plant. The Capitol Motors Corporation, 34 Borden Building, Fall River, Mass., has issued a list of 27 tools, which may be required for a plant at Tiverton, R. I.

At Cleveland the American Steel & Wire Co. has revised an old inquiry for several machines; the Stearns Conveyor Co. is figuring on a round lot of tools and a northern Ohio manufacturer is considering the purchase of 40 to 50 machines.

Export business continues quiet, but a Cincinnati lathe builder is reported to have booked a fairly large order, regarding which no details are available. The Japanese Government continues its interest in American tools and may purchase extensively for arsenals in that country. The Western Electric Co. has recently bought tools for shipment to Japan; also for its domestic plants.

New York

NEW YORK, April 5.

The past week has not brought any improvement in machine-tool business. A few orders have been placed by the American Sugar Refining Co., chiefly punches and shears and pipe machines, but the remainder of this company's recent list of 50 machines is being held up temporarily. The General Electric Co., Schenectady, N. Y., has not purchased against its recent list of 30 machines, and probably will cover most of its requirements by moving machines from one department to another.

With the exception of a 600-ton wheel press purchased by the Bangor & Aroostook Railroad, there has been no railroad buying. A settlement of the railroad problem appears to be necessary before the roads can get into a condition to buy more extensively.

Further price reductions are noted, particularly on radial drills, planers and some leading makes of lathes.

The Singer Mfg. Co., New York, is reported to be in the market for various types of equipment for a Canadian plant, but purchases may be made in Canada.

The Japanese Government continues to show interest in American machine-tool equipment, and it is probable that extensive purchases may be made within the near future for Government arsenals in that country. Otherwise export business is extremely dull. The Western Electric Co. has recently bought tools for shipment to Japan and also some for its domestic plants.

Inquiry for cranes continues fair, but sales are not numerous and the large inquiries in the market are still pending. The City of Philadelphia, which is in the market for three 10-ton overhead traveling cranes, will shortly ask bids on an additional 20-ton overhead traveling crane. Bids have been requested by the United Electric Light & Power Co., New York, on a 6-ton, 12-ft. span and a 3-ton, 25-ft. span hand-power cranes. The Davis Slate & Mfg. Co., Fairhaven, Vt., is still in the market for a 5-ton, 75-ft. span overhead traveling crane. The Porcupine Co., Bridgeport, Conn., which will shortly build a new fabricating shop, has requested information on the proper arrangement of cranes and other machinery and will inquire for cranes at a later date. Dutilh-Smith & McMillan Co., 50 Broad Street, New York, has asked for bids on a locomotive crane.

Among recent sales are: Industrial Equipment Co., 149 Broadway, New York, eastern representative, H. D. Conkey & Co., three 5-ton, 40-ft. span hand-power cranes, one of which is electrically driven and 10 2-ton and 3-ton trolleys to the Eastern Structural Steel Co., 51 East Forty-second Street, New York, for a new plant at Easton, Pa.; Shepard Electric Crane & Hoist Co., a 1-ton, single I-beam crane for the ice plant of the Anthracite Brewing Co., Mount Carmel, Pa.

Durant Motors, Inc., 1764 Broadway, New York, has acquired the plant of the Goodyear Tire & Rubber Co., Jackson Avenue and Honeywell Street, Long Island City, on site, 238 x 406 ft., for about $2,000,000. The structure will be equipped as an automobile assembling plant, with capacity of about 25,000 cars per year, and will be operated in the name of the Durant Motor Co. of New York, a subsidiary of the parent organization. The operating company is capitalized at $3,000,000 and the parent concern at $5,000,000. Both are headed by W. C. Durant, formerly president General Motors Co., and who recently, it is said, secured a substantial interest in the Studebaker Corporation.

The Carle Shipbuilding & Repair Co., Rockaway Beach, L. I., has been incorporated with a capital of $25,000 by W. J. Francis, R. F. Lenahan and C. H. Carle, Rockaway Beach, to operate a shipbuilding plant and marine repair works.

A one-story electric power plant, and one-story automobile service and repair works, will be erected by the Willow Brook Dairy Co., Mount Vernon, N. Y., in connection with its new local plant estimated to cost about $250,000. The McCormick Co., Century Building, Pittsburgh, is architect.

Hartt & Lane, Inc., New York, has been incorporated with an active capital of $52,500 by N. Lane, Jr., J. J. Hartt and S. Faust, to manufacture electrical appliances and equipment. The company is represented by F. H. Field, 29 Liberty Street.

Sasco Brothers, Long Island City, N. Y., operating an automobile service works and repair shop at Payntar Avenue and Prospect Street, have plans under way for extensions and improvements in their three-story plant to cost about $125,000, including equipment.

The Townsend Repair Works, Richmond, S. I., has been incorporated with a capital of $50,000 by R. and J. A. Townsend, and C. J. Nygard, Richmond, to operate a marine repair

and machine works. The company is represented by C. A. Clayton, 44 Court Street, Brooklyn.

The Utica Metal Folding Furniture Co., Utica, N. Y., has been incorporated with a capital of $20,000 by H. A. and A. E. St. John, and T. L. Wilder, Utica, to manufacture metal furniture and kindred products.

The Kovats & Knauber Iron Works, 673 East 133d Street, New York, have filed plans for two one-story additions, 100 x 101 ft., and 50 x 75 ft. respectively, estimated to cost about $35,000. Rudolph Kovats is president.

The Friedman-Maher Corporation, New York, has been incorporated with a capital of $100,000 by W. H. Keene and G. F. Maguire, 149 Broadway, and associates, to manufacture iron and steel products.

The New York Edison Co., 130 East Fifteenth Street, New York, will take bids until about April 15 for its new power plants on Cedar Street, and Greene Street respectively, estimated to cost about $160,000 and $130,000, with machinery. W. Whitehill, 12 Elm Street, is architect.

The E. O. Grabo Machine Works, New York, has been incorporated with a capital of $50,000 by E. O. Grabo, W. E. Lambden and B. M. Johnson, 1245 Putnam Avenue, Brooklyn, to manufacture machinery and parts.

The Anchor Bronze Co., New York, has been organized by R. J. Kupferman and J. Schaefer, 1703 Washington Avenue, to manufacture brass and bronze lighting fixtures and kindred equipment.

The Robert S. Conlon Co., New York, has been organized by R. S. Conlon and E. A. Voesseler, 149 Broadway, to manufacture electrical machinery and parts.

The William A. Force Co., 535 Pearl Street, New York, manufacturer of numbering machines and parts, has filed plans for an addition to its two-story factory at 216-32 Nichols Avenue, Brooklyn, to cost about $15,000.

The A. A. A. Mfg. Co., New York, has been organized by E. A. Bates and M. N. Gates, 49 Wall Street, to manufacture airplanes and parts.

The Cunard Terminal Corporation, a subsidiary of the Cunard Steamship Co., 21 State Street, New York, organized to construct a new freight terminal at Weehawken, N. J., has acquired 10 acres additional, to be used in connection with its new plant. Considerable freight handling machinery will be installed, including electric traveling cranes. The entire plant is estimated to cost close to $30,000,000. The Todd, Robertson & Todd Engineering Corporation, 347 Madison Avenue, New York, is engineer.

The New Jersey Gauge Co., West New York, N. J., has been incorporated with a capital of $100,000 by Robert S. Gaisford, E. S. and George L. Spence, 712 Monroe Place, to manufacture gages and other precision instruments.

The Horne Mfg. Co., Inc., Jersey City, N. J., has been incorporated with a capital of $100,000 by Ralph L. and Albert C. Henry, and Lawrence W. Horne, 243 Mercer Street, to manufacture railroad equipment and supplies.

The Model Engineering Co., 280 Henderson Street, Jersey City, N. J., has filed notice of organization to manufacture mechanical equipment, machine, mechanism models, etc. Henry Gora, 83 Railroad Avenue, heads the company.

The Millville Light & Power Co., Millville, N. J., is planning for the construction of a new electric power plant to cost about $250,000, including generating and other machinery.

The Florence Pipe Foundry & Machine Co., Florence, N. J., is completing plans for the erection of a new one-story machine shop, 60 x 200 ft. C. D. Green, Florence, is architect.

The Gainaday Electric Co., Jersey City, N. J., has been incorporated with a capital of $200,000 to manufacture electrically operated washing machines. The company is represented by Alfred F. McCabe, 15 Exchange Place.

The Public Service Co., Public Service Terminal, Newark, N. J., has filed plans for a one-story, brick machine shop on St. Pauls Avenue, Jersey City, N. J., to cost $17,500. On an adjoining site the company will build a new compressor plant to cost $32,300.

The Perth Amboy Dry Dock Co., foot of Broad Street, Perth Amboy, N. J., will install equipment at once at its new 10,000-ton drydock, which has been placed in position. A number of works buildings have been erected, including machine shop, metal working plant, etc., for use in connection with the dock.

The Acme Tile Co., Passaic, N. J., has been incorporated with a capital of $750,000 by Daniel E. Seal, Albert W. Reese and Thomas H. Hogan, 125 Prospect Street, to manufacture building tile and similar products.

The Oxman Body Co., Linden, N. J., has been organized by Joseph Oxman and Henry Litt, St. Georges Avenue and Stiles Street, to manufacture automobile bodies and motor car equipment.

The Solon Automobile Body Manufacturers, Inc., Union Hill, N. J., has been incorporated with a capital of $25,000 by Louis Branch and Ludwig Solon, 970 Springfield Avenue.

The Millville Pulp & Pine Products Co., Millville, N. J., is having plans prepared for the erection of a new one and two-story mill for the manufacture of wood pulp. Considerable machinery will be installed.

The Bretscher Mfg. Co., 72 Marshall Street, Newark, manufacturer of automobile tail-light devices and other metal equipment, has leased additional property at 29 Congress Street for a new plant unit.

The Brass, Bronze & Copper Co., Superb Building, Newark, has filed notice of organization to manufacture brass, bronze and other metal products. The company is headed by Irving N. Schafman, 212 Elizabeth Avenue.

Agens & Co., Inc., Newark, has been incorporated with a capital of $100,000 by Sylvester H. M. Agens, George W. Finger and Edward B. Tousek, 283 Market Street, to manufacture lamps and other metal products.

The Consolidated Tool Works of New Jersey, Inc., Newark, has been incorporated with a capital of $25,000 by Harry Taub, M. Rittenband and Percy H. Penn, Newark, to manufacture machinery and tools. It is represented by Harry L. Tepper, 800 Broad Street.

The Clinton Hill Auto Radiator & Lamp Repairing Co., 182 Badger Avenue, Newark, has filed notice of organization to operate a factory for automobile radiator production, parts manufacture and general repair work. Arthur Morett, 359 Fourteenth Avenue, heads the company.

The Schulte Mfg. Co., Newark, has been incorporated with a capital of $100,000 by George A. Schulte and associates, to manufacture machinery and parts. It is represented by Braelow & Tepper, 800 Broad Street.

The American Tube Bending Co., Newark, is having plans prepared for a new one-story factory, 61 x 115 ft., on Colt Street, Irvington, to cost about $23,000. Strombach & Mertens, 1091 Clinton Avenue, are architects.

The American Welding Co., 24 Kinney Place, Newark, has filed notice of organization to operate a machine shop and welding works. A. R. Walling, 278 Johnson Avenue, heads the company.

Arthur D. Reeve, Newark, has had plans prepared for a new foundry, 40 x 50 ft., at 318-26 Passaic Avenue, for the production of brass, bronze and other metal castings. An extension will be erected at a later date. The present building will cost about $10,000, exclusive of equipment. Fitzsimons & Richards, 207 Market Street, are architects.

The Chase Electrical Service Co., 88 Washington Street, Newark, has been organized to manufacture electrical specialties. Arthur B. Chase, 577 High Street, heads the company.

The Wolkoff Machine Works, Inc., Newark, has been incorporated with a capital of $100,000 by John Wolkoff, Harry L. Denberg and Nathaniel M. Fruchtman, 156 Market Street, to manufacture machinery and tools.

New England

BOSTON, April 4.

Local sales of machine tools the past week were smaller than for any previous corresponding period this year. However, an occasional order for one or two machines, the fact that several inquiries made some time ago can still be called live prospects and a readjustment in prices for various makes of equipment have served to keep interest alive. Planing machine manufacturers have made a reduction in prices of about 10 per cent, including the Hamilton Machine Tool Co., Hamilton, Ohio; the G. A. Gray Co., Cincinnati, and the Woodward & Powell Planer Co., Worcester, Mass. A Worcester maker of lathes has cut prices 10 per cent, and the Porter-Cable Machine Co., Syracuse, N. Y., has reduced quotations 10 per cent on its line of toolroom lathes, but is maintaining old levels on other lathes. The Hamilton Machine Tool Co. also has reduced lathes 10 per cent. The Badger Tool Co., Beloit, Wis., has made a reduction of approximately 15 per cent on disk grinding machines.

The Boston & Albany Railroad has purchased a 24-in. Cincinnati crank planer and delivery has been made at a western Massachusetts shop, but prospects for machine-tool buying by other New England railroads are not encouraging Sales the past week include two Milwaukee milling machines to a Woonsocket, R. I., interest. The Capital Motors Corporation, 34 Borden Building, Fall River, Mass., recently incorporated, which contemplates the erection of a plant at

Tiverton, R. I., is preparing the following list of equipment, but against which it will not buy for some time:

One 14-in. x 6-ft. tool room lathe.
Two 14-in. x 6-ft. manufacturing lathes.
One standard milling machine.
One tool room grinder.
Two 20-in. drill presses.
One four-spindle sensitive drill.
Two upright drills.
One two-spindle automatic sensitive drill.
Two single-spindle drills.
One tapping machine.
One threading machine.
One keyseater.
Two power hack saws.
Three arbor presses.
One 18-in. disk grinder.
One 14-in. shaper.
One portable tool grinder.
One drill grinder.
One wet tool grinder.
One bench drill grinder.

The local used-tool market has been decidedly more active than the new. A Trenton, N. J., steam turbine company has purchased considerable equipment, including a No. 5-C Becker vertical milling machine, a Kempsmith universal milling machine and two 20-in. shapers. A New Bedford, Mass., concern, starting a new shop, bought a 14-in. x 6-ft. manufacturing lathe, a speed lathe, shaper, 20-in. drill press, motors, shafting and pulleys, while a Bellows Falls, Vt., garage took a 28-in. x 16-ft. lathe, 14-in. x 6-ft. lathe, an upright drill and a shaping machine. Other sales include a drop hammer, a 14-in. x 6-ft. lathe, an upright drill, a small sensitive drill and shaper to a Taunton, Mass., company; a cylindrical grinder and other equipment by the Central Machine Works, Worcester, and a toolroom grinder by a West Medway interest.

Within the past 10 days manufacturers of compressors have had a big increase in the number of inquiries, some of which involve an expenditure of $27,500. These come from a wide variety of sources and, although not having a direct bearing on the machine-tool business, are encouraging as indicating increased operations.

The auction of the machinery of the Bristol Machine Tool Co., Bristol, Conn., on March 15, brought out a large patronage from all over the United States. Practically all of the 1500 tools, in 460 lots, were sold. Some of the more important machines brought the following prices: One 32-in. Lucas horizontal boring mill, $4,000; two No. 1 Cleveland horizontal boring, milling and drilling machines, one for $1,450 and the other for $1,425; one 3 x 36-in. Jones & Lamson turret lathe, late type, $1,500; one Kearney & Trecker universal milling machine, $925; 20 Becker milling machines, purchased by the Eastern Machinery Co., Cincinnati, at an average price of $45; one No. 3½ American, old-style, cone-drive drill, $770; one 16 x 36-in. x 14-ft. Fay & Scott motor-driven gap lathe, $400; one 2 x 24-in. Jones & Lamson turret lathe, $925; one 50-kw. generator, direct connected to a Harrisburg engine, $510; one 36-in. Whiton automatic spur gear cutter, $620; one 22 x 22-in. x 5-ft. Whitcomb-Blaisdell planer, $700; one 24 x 24 x 6-ft. Whitcomb-Blaisdell planer, $720; one 28 x 28 x 6-ft. Rockford planer, $810.

The plant of Charles A. Richardson, Otis Street, Mansfield, Mass., shuttle irons and steel specialties, was partly destroyed by fire March 28.

The Den-Hart Mfg. Co., New Haven, capitalized for $50,000, has taken out a Connecticut charter to manufacture washing machines, wringers, etc.

The coreroom of the Valley Falls Foundry Co., McCondry Street, Valley Falls, Conn., last week was destroyed by fire with an estimated loss of $20,000.

Monks & Johnson, Boston, engineers, have completed plans for a four-story addition, 70 x 100 ft., to the main plant of the Dennison Mfg. Co., Framingham, Mass., paper products.

The one-story, 100 x 200-ft. plant and machinery of the Kenneu Mfg. Co., Wellington Avenue, Auburn, R. I., brass curtain rods, were badly damaged by fire last week.

The Bridgeport Furnace Works, Bridgeport, Conn., is installing machinery for the manufacture of furnace fittings. It is specializing in a new heating and ventilating system.

A Rhode Island charter has been issued to the Ernst H. Lohrmann Co., Providence, with a capital stock of $12,000 to manufacture dies, tools and machinery. Theodore A. Droz and Thomas Curran are interested in the company.

The Vulcan Contact Mfg. Co., 50 Willow Street, Springfield, Mass., last week sold at auction three 6-ft. lathes, two bench lathes, two automatic screw cutting machines, one universal milling machine, a small grinder, one Sigourney two-spindle drill and one cutting-off saw.

The steamship terminal of the Grand Trunk Railway, Portland, Me., is to be enlarged at a cost of $500,000 and will include the erection and equipment of two freight buildings. It also is considering the erection of coal-handling pockets at East Deering, Me., to cost $1,000,000.

The Auto Body Builders, Worcester, Mass., recently organized, will operate a plant at 86 Exchange Street for the manufacture of metal automobile bodies.

The Acme Clamp Co., Boston, Mass., has filed notice of organization to manufacture clamps and other metal products. George E. Gay, 73 Tremont Street, heads the company.

The Tuxis Metal Co., Meriden, Conn., heavy metal products, has acquired property on North Colony Street for about $37,000, improved with a one-story building, for extensions. A. J. White is president.

The Bellis Heat Treating Co., New Haven, Conn., has been incorporated with a capital of $75,000 by H. E. Adt, H. Hewitt and W. B. Gumbart, 699 Elm Street, to manufacture heat-treating equipment and other machinery.

The Hart & Cooley Co., New Britain, Conn., manufacturer of wrought-steel registers, ventilators, grilles, etc., has been consolidated with the Hart & Hutchinson Co., of the same city, manufacturer of steel lockers, shelving, etc.

The Atlas Auto Top & Radiator Works, 167 Broadway, Providence, R. I., has filed notice of organization to manufacture radiators and other metal products. Walter R. Craddock, 113 Reservoir Avenue, heads the company.

The Washusett Motors, Inc., Fitchburg, Mass., has awarded a contract to the W. J. Handley Co., 10 Railroad Street, for a one-story plant, 106 x 116 ft., on Lunenburg Street, for the manufacture of motor truck parts, etc., to cost about $15,000, exclusive of equipment. F. S. Suthergreen is president.

The O'Hara-Waltham Dial Co., Waltham, Mass., has completed plans for an addition, 50 x 60 ft., to cost about $15,000.

The Connecticut Rubber Corporation, Hartford, Conn., has been incorporated with a capital of $500,000 by H. S. Blynt, L. B. Sherwood and H. B. Herrup, 435 Farmington Avenue, to manufacture rubber products.

The Arcade Malleable Iron Co., Albany and Muskeego streets, Worcester, Mass., has acquired the property of the Richard French Iron Works, on Muskeego Street, that city. The property, which includes approximately an acre of land and a large erection shop, is in close proximity to the Arcade Malleable Iron Co. property, and its acquisition will make the latter's plant one of the largest of its kind in New England. The erection shop is so constructed it easily can be converted into a foundry for the production of heavy or light castings at comparatively little expense, but for the present it will be used for storage purposes. H. P. Blumenauer is general manager of the Arcade plant.

The Romer Motor Corporation, Boston, recently incorporated with a capital of $5,000,000, has purchased 16 acres in Danvers, Mass., and contemplates erecting an assembling plant having approximately four acres of floor space and capacity of about 25,000 passenger cars and trucks per year. A. J. Romer, formerly associated with the Northway Motor Corporation, Natick, Mass., is president and James L. Roope, Salem, treasurer and secretary. The company has acquired the rights to the Romer patterns, designs, automotive patents, etc.

The Modern Tool & Die Co., Leominster, Mass., will erect a two-story wooden machine shop, 30 x 50 ft., on Spruce Street.

Philadelphia

PHILADELPHIA, April 4.

There were more sales in the early part of March than during the latter two weeks. Business is at very low ebb. One striking exception is the report of a Philadelphia agent of a maker of grinding machines, who has made several single sales in the Philadelphia district of cylindrical grinders. So great is the demand for this type that the factory is working 55 hr. a week and cannot promise deliveries before May.

Promised developments of railroad buying have not materialized. The list issued by the Virginian Railway a month ago is still pending and it is reported that immediate purchase is not likely. The inquiry of the Chesapeake & Ohio has been withdrawn. It is pointed out that the lesser travel, the many idle freight cars and the small volume of shipping have taken the edge off the demand for railroad repair shop equipment. Railroads in this vicinity have scores of unused locomotives in yards, thoroughly repaired, but not needed.

The slight improvement in the automotive industry has helped this district in a small degree. Some of the makers of radial drills reduced prices approximately 10 per cent about 10 days ago.

The city of Philadelphia is in the market for cranes for the departments of water and city transit. Bids for one 10-ton crane were opened April 5; bids for two 10-ton cranes

will be opened April 12; a date is still to be set for bids on a 20-ton crane.

The De Laval Steam Turbine Co., Trenton, N. J., which asked for tools, including lathes, upright and radial drills, has bought some of its requirements. Several houses are bidding on magnetic chucks for the naval ordnance plant at Charleston, W. Va.

The Worthington Pump & Machinery Corporation, 115 Broadway, New York, has acquired the holdings of the War Department at its plant at Hazleton, Pa., at a cost of about $4,000,000. The acquisition gives the Worthington company complete control of the plant and it is said that operations for the manufacture of pumping machinery and similar equipment will commence at an early date. The plant has been idle for many months.

The Atlantic Auto Radiator Co., Philadelphia, Pa., has established a works at 1365 Ridge Avenue for the manufacture of radiator cores and kindred equipment.

The Three B Gas Stove Co., Philadelphia, is being organized by Joseph P. and J. Grant Kerrigan, and George W. Scutter, Philadelphia, to manufacture stoves, heaters and like equipment. Application for a State charter will be made April 18. The company is represented by Maurice W. Sloan, Drexel Building.

The John T. Lewis & Brothers Co., Lafayette Building, Philadelphia, will install a new crane and crane runway at its paint and color plant on Aramingo Street.

The Wedmore Concrete Specialty Co., Philadelphia, is being organized by Daniel A. Wedmore, J. Jacob and Louis Baylson, to manufacture wire and other metallic products for concrete reinforcing work. Application for a State charter will be made on April 15. Loewenstein, Winokur & Baylson, Land Title Building, represent the company.

The Machinery & Metals Corporation, Philadelphia, is being organized by Harry A., Henry B. and Nathan Robinson, Philadelphia, to manufacture machinery and metal products. Application for a State charter will be made April 25. The company is represented by Josiah H. Marvis, Land Title Building.

The American Steel & Wire Co., Hamilton Avenue, Trenton, N. J., has filed plans for a new one-story, brick and steel building on South Broad Street, 60 x 313 ft., to cost about $20,000, exclusive of equipment.

The Trenton Flint & Spar Co., Marion Street, Trenton, N. J., has awarded a contract to the Karno-Smith Co., Broad Street Bank Building, for the erection of two new mechanical buildings at its plant, two stories, 30 x 190 ft., and one-story, 30 x 50 ft., respectively, to cost about $75,000.

The Board of Education, Camden, N. J., will install equipment to cost about $50,000 in the manual training department at the high school.

A new power plant to cost about $65,000 will be constructed by the Board of Trustees, Danville State Hospital for the Insane, Danville, Pa. William F. Shay is president. Plans will be prepared at an early date.

The Caloric Pipeless Furnace Co., Altoona, Pa., has been incorporated with a capital of $30,000 to manufacture furnaces, heating equipment, etc. Ross C. Ferry, Roaring Springs, Pa., is treasurer.

The Merchants' Shipbuilding Corporation, Bristol, Pa., has taken an option to purchase the local shipbuilding plant for $1,300,000, constructed by the Government during the war at a cost of about $15,000,000.

Cleveland

CLEVELAND, April 4.

The local machine tool trade is looking for some improvement in sales this month as compared with March, basing this hope on a little more inquiry from companies that are lining up some machinery that they will need when their manufacturing operations are more nearly normal. Sales were very light the past week and few orders were placed for more than single machines, although a Michigan automobile manufacturer placed an order with a Cleveland builder for several special drilling machines.

The American Steel & Wire Co. has revived and revised an inquiry sent out several months ago. This new list includes four lathes, a drilling machine, an 850-lb. drop hammer and a cold saw. The Stearns Conveyor Co., Cleveland, will shortly purchase a round lot of machinery for its new plant. One local dealer has quoted on a list of requirements for a northern Ohio manufacturer, who, it is stated, is considering the purchase of 40 to 50 machines.

The Stearns Conveyor Co., Cleveland, which was recently organized to manufacture conveying and other equipment, is in the market for machinery which will include wood-working tools, drill presses, lathes, shapers, milling machines, punch presses, a shearing machine, brake and saw. The company has commenced the erection of the first unit of its plant, which will be one-story, 50 x 200 ft., and expects to have it ready for operation about May 1.

The new strawboard plant to be built by the H. K. Ferguson Co., Cleveland, for the Hinde & Dauch Co., Sandusky, Ohio, at Fort Madison, Iowa, brief mention of which was made last week, will include a rotary building, 45 x 130 ft., two stories; a beater building, 65 x 110 ft., four stories; a two-story machine building, 40 x 300 ft.; one-story storage building, 120 x 220 ft., and a two-story power plant, 75 x 120 ft. All the structures will be of reinforced concrete, brick and steel.

The Lima Sheet Metal Products Co., Lima, Ohio, expects to place a contract shortly for a new plant, one-story and basement, of mill type, providing about 22,000 sq. ft. of floor space on the first floor.

The Smith & Patten Motor Sales Co., Defiance, Ohio, is planning the erection of a one-story factory, 144 x 144 ft., for the manufacture of automobile tops and bodies.

The H. K. Ferguson Co., Cleveland, has taken a contract for a power plant at Trinity College, Durham, N. C.

Chicago

CHICAGO, April 4.

A number of leading makes of planers, engine lathes and radial drills have been reduced 10 per cent., among them being Cincinnati-Bickford, Carlton, and Fosdick radial drills, Gray and Cincinnati, planers, and Lodge & Shipley engine lathes. Although the market is still very quiet it is notable that totals of March sales showed an improvement over the records for February and January, in the case of one dealer an improvement of about 35 per cent. Current purchases are confined principally to single machines, although occasionally a fair sized sale is made. During the past week a large local industry bought repair shop equipment, includnig a 20-in. shaper, an 18-in. x 14-ft. engine lathe, a 24-in. drill press, and a No. 2½ universal milling machine, and will probably purchase a few more tools. The Illinois Central has bought a 20-in. x 10-ft. and a 24-in. x 14-ft. geared-in-head motor-driven engine lathe, and is also reported to have closed for a number of hack saws and grinders. The increasing activity in the automobile industry has not yet been reflected in machine tool purchases in this market.

The Chicago Blow Pipe Co., 208 Clarkson Court, Chicago, has let contract for one-story shop to cost $25,000.

The Goldsmith Brothers Smelting Co., 5844 Throop Street, Chicago, has secured a building permit to construct an electric precipitator to cost $15,000.

The Union Steel Mfg. Co. has bought the plant of the Brazil Stamping & Mfg. Co., Brazil, Ind., and has installed machinery and made alterations. It will commence operations as soon as electrical equipment to connect with power lines has been installed.

The Southwest Steel Co., 570 West Phelps Avenue, Springfield, Mo., has opened a new iron foundry and is pouring four tons of iron per day. In addition to iron castings, it expects soon to be prepared to make steel and non-ferrous metal castings.

The Carmean Electric Co., Kansas City, Mo., has been incorporated with the following officers: President, S. M. Carmean; vice-president, W. H. Nance; secretary, Edward E. Naber; treasurer, H. P. Bowman. It will manufacture an electrical heater which can also be used as a ventilating fan.

The Beatrice Foundry & Machine Works, Beatrice, Neb., is operating at capacity, having secured several large contracts, including a $10,000 order for castings from the Chase-Tinsman Plow Co., Lincoln, Neb., a $7,000 order from the Bolte Mfg. Co., Kearney, Neb., to supply castings for concrete mixers and a $40,000 contract with the Highway Maintainer Co., Lincoln, Neb.

The Carbell Typewriter Corporation, formerly at 1812 Allen Street, Chicago, has purchased the two-story plant of the Collins Safety Razor Co. at 4319-37 West Lake Street.

A. G. Burton & Sons Co., formerly at 118 South Clinton Street, Chicago, has leased the third floor of the building at 1323-25 South Michigan Avenue, containing 5600 sq. ft. It manufactures binders' and printers' machinery.

The Durand Steel Locker Co., Chicago Heights, Ill., plans a one-story factory addition.

The Railway Steel Spring Co., Chicago Heights, Ill., has prepared plans for a one-story addition, 70 x 160 ft., to cost $60,000.

The Siegler Enamel Range Co., Belleville, Ill., has been incorporated by Otto Siegler, John Brog, Leander Neubarth,

et al., with $50,000 capital stock. It will operate a foundry adjoining the Illinois Central Railroad tracks in the southeastern part of the city.

The Central Architectural Iron Works, 3105-11 West Twenty-seventh Street, Chicago, has let contract for a one-story iron works, 30 x 124 ft., at 3101 West Twenty-seventh Street, to cost $8,000.

The Thomas Cusack Co., bill poster and sign manufacturer, 1312 West Harrison Street, Chicago, has let contract for a one- and two-story garage and sign plant at 1333-47 West Congress Street to cost $100,000.

The Edward Valve & Mfg. Co., East Chicago, Ind., has decided to postpone the reconstruction of the one- and two-story plant at 1200 145th Street, recently destroyed by fire.

The American Stamping Co., Battle Creek, Mich., has awarded contract for a two-story plant, 110 x 125 ft., to cost $100,000.

A. Durr & Co., sheet metal workers, 2940 West Lake Street, Chicago, have let contracts for a one-story shop, 33 x 80 ft., at 1937-39 West Walnut Street, to cost $5,000.

The Wold Air Brush Mfg. Co., 716 West Madison Street, Chicago, has purchased a two-story factory at 2173 North California Avenue.

The La Salle Woodworking & Lumber Co., 2306 South La Salle Street, Chicago, has purchased two and one-half acres at Fifty-fourth Avenue and Nineteenth Street, and in two months will start work on a one-story plant to contain 40,000 sq. ft. of floor space and to cost $160,000.

The Douglas Auto Parts Co., 2005 South State Street, Chicago, has been organized by Samuel and Edward Weisman to manufacture automobile parts and other motor equipment.

The Inland Engineering Co., room 914, 140 South Dearborn Street, Chicago, has been incorporated with a capital of $20,000 by Walter S. McKee, Claude Rorabeck and Eugene C. Bauer to manufacture machinery and parts.

The Illinois Oil Co., Rock Island, Ill., is having plans prepared for the erection of a new three-story and basement plant, 40 x 150 ft., at Fourth Avenue and Twenty-fourth Street, estimated to cost about $135,000 with machinery. Cervin & Horn, Rock Island, are architects.

The Midland Steel Products Co., 3136 South Canal Street, Chicago, has awarded a contract to Holton, Seelye & Co., 140 South Dearborn Street, for its new one-story plant, 75 x 125 ft., at 1752-58 East Seventy-fifth Street, estimated to cost about $55,000.

The Anderson Brake Appliance Co., Chicago, has been organized by Walter F. Olds and William F. Wauch to manufacture brakes and other mechanical equipment. The company is represented by Olds & Tourje, Marquette Building.

The Hennepin Atomized Fuel Co., 520 Security Building, Minneapolis, Minn., is completing plans and will soon call for bids for its new one-story fuel-crushing plant, 60 x 150 ft., at St. Paul, Minn., estimated to cost about $150,000 with machinery. C. L. Bohannon, chief engineer, is in charge.

The West Frankfort Boiler & Machine Shop, Inc., West Frankfort, Ill., has filed notice of dissolution under State laws.

The Denver & Rio Grande Railroad Co., Denver, Colo., recently acquired by new interests, is arranging a fund of $12,000,000 for extensions and improvements, including the erection of new repair shops, additions to locomotive and car repair works and the installation of considerable new machinery. A. R. Baldwin is acting as receiver.

The Denver Gas & Electric Light Co., Denver, Colo., has arranged for a bond issue of $1,000,000, a portion of the proceeds to be used for extensions and improvements in electric plants. Frank W. Frueauff is president.

Cincinnati

CINCINNATI, April 4.

Continued improvement was noted in the machinery market the past week. Reinstatement of old orders from automotive companies and tire manufacturers was reported by several manufacturers, and other lines of industry are more active. No big lists are out and buying is confined almost entirely to one and two machines. A local manufacturer of engine lathes is said to have booked a large order for export, but no details have been given out. A Pacific Coast dealer who recently inquired for 15 to 20 engine lathes is understood to have purchased the machines from Government stocks on the East coast and will be able to lay them down on the Pacific Coast at a somewhat lower price than actual cost of manufacture. The used-tool market is fair, one dealer making a sale of six machines to a plant in eastern Ohio and a similar number to a manufacturer in Huntington, W. Va.

German manufacturers are circularizing dealers, offering machine tools and machine shop accessories at low prices.

Several local manufacturers have come to an agreement with their employees in which the latter have accepted a cut of 15 per cent in wages, the working hours to be increased from 24 to 40 per week. This cut in wages was made compulsory by recent reductions in prices of tools and the consequent necessity of cutting down manufacturing costs.

Several manufacturers of drilling machines have reduced prices 10 per cent, and a planer manufacturer has announced a similar reduction.

The Triple Way Curtain Bracket Co., Cincinnati, recently incorporated with a capitalization of $20,000, has secured a plant at Linwood Road and Morse Street and has purchased part of its equipment. W. H. Solger and C. C. Cooper head the company, with offices for the present at 203 Lincoln Inn Court Building, Cincinnati.

The Cincinnati Lamp & Bracket Co., West Fourth Street, Cincinnati, has been incorporated with a capitalization of $50,000 to manufacture spotlights for automobiles. It will later increase operations to take in a full line of lamps. Theodore Luth is president.

The Wirthlin-Mann Co., Cincinnati, builder of elevators and mill supply jobbers, has purchased a six-story structure at the corner of Plum and Commerce streets with a floor area of 30,000 sq. ft. and direct switching facilities with the Pennsylvania Railroad. It intends to equip a machine shop in its new premises. George A. Mann is vice-president.

R. P. Tullis and John J. Puskar, Pittsburgh, are interested in a company recently organized to manufacture automobile springs in a building at 205 East Copeland Street, Columbus, Ohio.

The Ironton Stove & Mfg. Co., Ironton, Ohio, will increase its capitalization from $100,000 to $300,000 to take care of improvements and extensions contemplated in the near future.

The Morrow Mfg. Co., Wellston, Ohio, manufacturer of coal mining equipment, is contemplating the erection of an extension to its plant, 100 x 300 ft. Frank Morrow is vice-president and general manager.

The Springfield Light, Heat & Power Co., Springfield, Ohio, is contemplating the expenditure of approximately $200,000 for new equipment and expansion during the year. C. I. Weaver is vice-president.

Baltimore

BALTIMORE, April 4.

The Mount Savage Fire Brick Co., Mount Savage, Md., has awarded a contract to Golin Gerlach, Frostburg, Md., for additions to its plant and a power house, 50 x 90 ft., estimated to cost about $85,000.

The General Mfg. Co., Church and North Prospect streets, Hagerstown, Md., has been incorporated with a capital of $50,000 by Henry, F. S. and William H. Huss, Hagerstown, to manufacture metal specialties.

Edro Richardson, 318 North Holliday Street, Baltimore, has acquired property on Exeter Street and has had plans prepared for converting the building into a machine shop. Bids will be asked at once.

The Southern Steel Construction Co., 19 East Lombard Street, Baltimore, has been incorporated with a capital of $100,000 by William S. Briddell, Thurley W. Spydell and Walter C. Mylander to manufacture iron and steel products.

A new paper mill to cost about $500,000 with machinery will be erected by the Gwynns Falls Paper Co., Gwynns Falls, Baltimore, now being organized with a capital of $600,000. Plans for the works are nearing completion and bids will be asked at an early date. Joseph H. Wallace & Co., 5 Beekman Street, New York, are engineers for the project.

The Standard Oil Co., Canton, Md., has completed plans for the erection of a one-story power house at its local works, 100 x 140 ft., estimated to cost about $50,000.

The C. H. Friant Rubber Co., 1417 West Franklin Street, Baltimore, has been incorporated with a capital of $50,000 by Charles H. Friant, Charles P. Thompson and Charles Hess, Jr., to manufacture rubber products.

The Phelps Can Co., foot of Lawrence Street, Baltimore, has filed plans for its new one-story factory at Fulton Avenue and Eagle Street, 112 x 178 ft., estimated to cost about $34,000.

M. L. Himmel & Sons, Gay and Lexington streets, Baltimore, manufacturers of office furniture, etc., plans to establish an additional factory.

The Midway Foundry & Machine Shop, Burlington, N. C., will establish a machine shop and install additional equipment. J. G. King is manager.

The Garage Equipment Co., Wilmington, Del., has been incorporated with a capital of $50,000 by Harry K. and Charles I. Hoch, 904 Jackson Street, and John J. Jolls to manufacture gasoline and air pumps and other garage equipment.

Alexander & Garsed, Charlotte, N. C., have awarded a

contract to T. C. Thompson, Charlotte, for a new two-story machinery and parts plant, 100 x 100 ft., estimated to cost about $50,000.

The Hunt's Automatic Stop Motion Co., Inc., Charlotte, N. C., recently incorporated with a capital of $125,000, is planning for the erection of a new local plant for the manufacture of operating mechanisms and machinery for textile service. R. L. Saunders is head.

The American Pine Products Refining Co., Salisbury, Md., recently organized with a capital of $250,000, is considering plans for the erection of a new refinery. H. D. Elliott, Salisbury, and B. A. Deal, Jr., Nashville, Ga., head the company.

The Superior Williams Mill Co., North Wilkesboro, N. C., has plans under way for the erection of a new factory on the Reddies River for the mnaufacture of portable milling equipment. It is estimated to cost about $45,000. E. V. Williams is manager.

The Parenti Motors Corporation, Mutual Life Building, Buffalo, manufacturer of automobiles, now building a new plant at Northumberland and Kensington avenues, is said to be planning the establishment of a new assembling plant in the vicinity of Atlanta, Ga.

The Carolina Pine Products Co., Hamlet, N. C., recently organized, has plans under way for a new oil refinery. C. R. Poole is president.

The Moore Hardware Co., Inc., Washington and Union streets, Petersburg, Va., will soon award contract for a new factory for the manufacture of hardware specialties. A site is being selected. T. J. Moore is president.

Detroit

DETROIT, April 4.

The betterment in the automotive industry does not seem to have any apparent effect upon the machine-tool situation, and the market remains stationary.

The new pressed steel plant of the Maxwell-Chalmers Motor Car Co., Detroit, which has been under construction for several months, is now ready for operation and will get into production shortly and will handle all the pressed steel work for the Maxwell-Chalmers Co. It has a floor space of 217,000 sq. ft.

The Southern Michigan Brass Founding Co., Hudson, Mich., capitalized at $15,000, has been incorporated by Richard Allingham, William O'Brien and G. G. Taylor.

The Triangle Motor Truck Co., St. Johns, Mich., is considering the construction of a one-story addition. Frank Stinebower is secretary.

The Hodges Chain Co., Galesburg, Mich., has been incorporated with a capital of $60,000 by Chauncey W. Hodges, Galesburg; Byron E. Shutt and Richard C. Edwards, Kalamazoo, Mich., to manufacture skid-chains for motor car service and industrial chains.

The Michigan Tool Co., 402 East Jefferson Avenue, Detroit, is having plans prepared for a new one-story plant, 90 x 200 ft., brick and steel, on Mack Avenue, estimated to cost about $65,000 with equipment. C. D. Lundblad, 206 New Telegraph Building, is architect.

The Peerless Products Co., Detroit, has been incorporated with a capital of $30,000 by S. H. Barrett, S. O. Mills and G. A. Dean, 65 Louise Avenue, to manufacture tools, dies, washers and other metal products.

The St. Johns Industrial Foundry, St. Johns, Mich., is considering the erection of an addition, 30 x 50 ft. It is proposed to break ground during the summer.

The Ceruti Aircraft Corporation, Detroit, is contemplating the erection of a plant for the manufacture of airplanes and parts. A site is being considered near the new Russel Municipal Aviation Field.

Pittsburgh

PITTSBURGH, April 4.

The machine-tool market is showing a little more life, although it cannot be termed active or satisfactory. Dealers continue to make fairly good sales from day to day of individual machines, and practically all of them are figuring on a number of inquiries. Generally, however, inquiries are for only a few tools. The Pittsburgh Board of Education will open bids April 14 for tools for the manual training departments of several of the high schools. The original inquiry specified 16 lathes, four for the Ralston high school and six each for the Allegheny and Schenley high schools, but the inquiry for the six lathes for the Schenley high school has been withdrawn. The boards of education of Johnstown and Butler, Pa., and Wheeling, W. Va., have put out inquiries for wood-working and engine lathes for high schools in those cities, the Johnstown inquiry specifying individual motors. Nothing yet has developed in connection with the recent inquiry of the West Penn Power Co., calling for seven or eight tools. The equipment of the International Nickel Co., Huntington, W. Va., is yet to be placed. While no formal inquiries have gone out, except for a 5-ton hand-power crane, the Wheeling Steel Corporation directors recently voted an appropriation of $3,000,000 for improvements and betterments at the Steubenville plant of its subsidiary, the LaBelle Iron Works.

Announcement has been made of a 10 per cent cut in the price of radial drills by the Fosdick Machine Tool Co., Cincinnati, and one or more Cincinnati makers of lathes have announced lower prices.

The crane market is a little more lively. The Pittsburgh Metallurgical Co., with plant at Niagara Falls, N. Y., recently placed a 5-ton overhead crane with the Whiting Corporation. Harvey, Ill., and the Indiana Foundry Co., Indiana, Pa., has bought a 3-ton, 20-ft. span crane from the same maker. The Wheeling Steel Corporation has an inquiry out for one 7½-ton overhead and one 20-ton overhead for continuous rolling-mill service, the inquiry specifying mill type cranes. These are wanted for the Whitaker-Glessner Co., a subsidiary. The Batavia Car Works, Batavia, N. Y., is figuring on a new plant, for which a 15-ton, hand-operated, 20-ft. span crane with two 7½-ton, hand-operated trolleys is wanted. The city of Ashtabula, Ohio, is to erect a power house soon and will probably need a crane. The engineers in charge of the International Nickel project at Huntington, W. Va., have informed several crane builders of the span of the cranes, and, since this detail now is eliminated, expectations are that the placing of the orders will come this week. Competition for crane orders is so sharp that the advantage in price is almost entirely with the buyer. A year ago crane builders were inclined to include all the parts and buyers made no objection to the costs. To-day elimination of the unnecessary parts is the order and this permits considerable cutting of prices. One company which has made investigation into its sales the past year finds that it was in value rather than in the number of cranes sold that last year's record exceeded the average of the previous five years.

The Insulite Co., Ellensboro, W. Va., has been organized to manufacture hard rubber substitutes, molding novelties and electrical insulators from composition, Bakelite, Condensite and Redmanol molded parts. A factory building, 80 x 160 ft., is now under construction. The company is in the market for the following machinery, on which bids will be received until April 15: Upright drills, power saw, universal milling machines, universal grinder, surface grinder, shapers, lathes, screw press, dynamo, rubber grinders or mills, 20-hp. boiler, water pumps, hydraulic pumps, accumulator, 35-hp. gas engine, 15-hp. gas engine, bench lathe, buffing machines, tables with steam jackets, tables with water jackets, water tanks and tower. Officers of the company are: President and manager, Edward J. White, to whose attention quotations should be directed; vice-president, John Andrews; secretary and treasurer, R. P. Wood. All of the officers reside at Ellenboro, W. Va.

The Air Reduction Co., 120 Broadway, New York, and 2555 Liberty Avenue, Pittsburgh, manufacturer of oxygen, etc., is having revised plans prepared for its new one- and two-story plant on Ridge Avenue, Pittsburgh, estimated to cost about $200,000 with equipment.

The Wiley Mfg. Co., Uniontown, Pa., has been organized to manufacture vacuum cleaners and parts. Dr. R. L. Carson, Uniontown, heads the company.

The Pittsburgh Metal Bed Co., Pittsburgh, has been incorporated with a capital of $100,000 to manufacture brass and iron bedsteads. D. L. Levenson, 5833 Northumberland Street, is treasurer.

The Thomas Roller Brake Co., Pittsburgh, is being organized by Joseph A. Thomas, Frederick E. Geier and J. Scott Morgan, Pittsburgh, to manufacture roller brake equipment, sheet-metal workers' machinery and other apparatus. Application will be made for a State charter on April 25. The company is represented by Paul G. McClelland, 610 Bakewell Building.

The Traver Engineering Co., Beaver Falls, Pa., manufacturer of machinery, structural steel specialties, etc., is planning the erection of an addition, 60 x 135 ft. H. G. Traver is president and George W. Sweeney, treasurer.

Plans are being prepared for a new one-story electric power plant at the Lewisburg Seminary for Girls, Lewisburg, W. Va. Dr. John I. Anderson is president. Stanhope S. Johnson, People's Bank Building, Lynchburg, Va., is architect.

The Parsons Coal Co., 418½ Tenth Street, Huntington, W. Va., will install new hoisting machinery, cars, pumping equipment and other mechanical apparatus at its properties. A. F. Parsons is president and manager.

The International Tank & Mfg. Co., Charleston, W. Va., recently incorporated with a capital of $100,000, will operate plants at Kansas City, Mo., and Chicago. The first noted

will be used for the manufacture of steel tanks and other plate construction, while the Chicago works will be devoted to the production of steel oil derricks and similar equipment. The company is headed by Charleston interests, including Floyd W. Mohler, Harry Beren and W. W. Walker.

The Montgomery Machine Works, Montgomery, W. Va., has been organized to manufacture machinery and tools. It is headed by J. A. Wendell, Montgomery, and O. B. Lowery, Charleston, W. Va.

The Twelfth Street Garage Co., Wheeling, W. Va., is taking bids for a new five-story automobile service and repair building at 77-81 Twelfth Street, 101 x 133 ft., estimated to cost about $150,000. C. W. Bates, Wheeling, is architect.

The Georges Creek Coal Corporation, Box 1341, Charleston, W. Va., recently organized, is planning the construction of a new coal tipple in this section. Other machinery will be installed, including electrical equipment. J. M. Harris is secretary and treasurer.

The Drayer Metal Products Co., Pittsburgh, has been incorporated with a capital of $25,000 to manufacture metal goods. H. J. Nesbitt, 421 Frick Building, is treasurer.

The Crane Co., 836 South Michigan Avenue, Chicago, manufacturer of valves and steam specialties, is taking bids on four steel and concrete buildings on Twenty-fourth Street, Pittsburgh, with main structure six stories, 75 x 192 ft., and three one-story buildings, averaging 65 x 288 ft., estimated to cost about $1,000,000. The Hunting-Davis Co., Century Building, Pittsburgh, is architect.

The Standard Sanitary Mfg. Co., 551 Preble Avenue, Pittsburgh, has awarded contract to the B. H. Groh Construction Co., 847 North Avenue, for a one-story brick and steel addition to its plant at Preble Avenue and Ontario Street.

The Delmar Coal Co., Fairmont, W. Va., is planning for the installation of a new conveyor system and other equipment at its properties in Monongalia County.

Buffalo

BUFFALO, April 4.

Joseph A. Sanders, 799 Northampton Street, Buffalo, is having plans prepared for a new one-story plant, 60 x 80 ft., at 115-17 Lathrop Avenue, for the manufacture of sheet metal products.

The Erie Crucible Steel Co., East Twelfth Street and Downing Road, Erie, Pa., has taken bids and will soon award contract for a one-story addition, 60 x 100 ft., estimated to cost about $75,000. Frank H. Payne is president.

The Volcano Torch & Mfg. Co., Erie, Pa., recently incorporated with a capital of $100,000, is having plans prepared for its new plant at Dunkirk, N. Y., for the manufacture of gasoline blow torches and kindred equipment, estimated to cost about $50,000. George E. Eichenlaub, Erie, is architect.

The Bliss Steel Products Corporation, Syracuse, N. Y., recently organized with a capital of $120,000, has awarded contract to Dawson Brothers, Union Building, for the erection of the initial building for its new plant at East Syracuse, 60 x 80 ft., estimated to cost about $15,000. It will specialize in the manufacture of structural steel products, steel sash, etc. G. C. and R. H. Bliss, 220 Gordon Avenue, head the company.

The Crystal Timers, Inc., Corning, N. Y., has been incorporated with a capital of $25,000 by T. A. McNamara, C. E. Manning and G. W. Cheney, Corning, to manufacture timing devices for gasoline engines and other mechanical equipment.

D. Thorne Gardner, Burlington, N. Y., has received permission from the Public Service Commission to build two electric power plants, one at West Burlington and the other at Edmeston, Otsego County.

Indiana

INDIANAPOLIS, April 4.

The C. & A. Potts Co., 816 West Washington Avenue, Indianapolis, manufacturer of brick-making machinery, is taking bids for its new one-story foundry, 60 x130 ft., brick and steel, estimated to cost about $45,000.

The Nonspin Cam Differential Co., Hartford City, Ind., has been incorporated with a capital of $50,000 by H. C. Everett, C. D. and B. M. Dudley to manufacture gears and gearing systems for automobile service.

The Evansville Electric & Mfg. Co., Evansville, Ind., has been incorporated with a capital of $25,000 by J. H. Moore, G. T. Powell and H. A. Robertson, Evansville, to manufacture electric motors and other electrical equipment. It is now operating a local plant and plans for extensions, with production to include bronze bearings, trolley wheels, etc.

The Ball Brothers Glass Mfg. Co., East Ninth Street, Muncie, Ind., is having plans prepared for the erection of a new one-story factory to cost about $50,000 with machinery.

The Black Diamond Coal Co., Boonville, Ind., is planning to rebuild its coal tipple, partially destroyed by fire, March 28.

The Sunbeam Electric Appliance Co., Milwaukee, Wis., is arranging for the removal of its plant to Evansville, Ind., where a local building has been acquired, which will be devoted to the manufacture of electrically operated washing machines. W. A. Carson, Evansville, has been made president of the company; E. D. Wemyss is secretary.

Fire, March 26, destroyed a portion of the plant of the Indian Refining Co., Vincennes, Ind., with loss reported at about $150,000.

B. A. Worthington, president C., I. & W. Railroad, has been made president of the Duesenberg Automobile & Motors Co., Indianapolis. Other officers are: L. M. Rankin, vice president and general manager, and F. A. Reilly, secretary-treasurer. Fred Duesenberg will continue as chief engineer and August Duesenberg as assistant. The first unit of the company's plant, at Washington and Harding streets, will be ready for occupancy this month.

The Mutual Auto Truck Co., capitalized at $5,000,000, now at Sullivan, Ind., has bought 15 acres at Peru, Ind., and will move its plant there after buildings have been erected.

Milwaukee

MILWAUKEE, April 4.

Increasing machine tool inquiries from the automotive and other industries have been the most interesting development of the past 10 days. Actual bookings, however, have shown but a negligible increase. The improvement in some lines of the metal-working industry has been offset to a considerable extent by the decline in the activity of others, principally makers of agricultural implements. The business that is being received consists of single machine orders and indicates that tools are not wanted particularly for increasing output, but to make urgent replacements or to increase efficiency. The demand for used tools is unchanged, with buyers more inclined to press for price concessions than at any time this year.

The Badger Tool, Die & Machine Works, 270 Fourth Street, Milwaukee, has reorganized as a Wisconsin corporation, styled the Badger Machinery Mfg. Co., with a capital stock of $50,000. The ownership and management remains unchanged. The principals are Peter Erickson, L. Fred Kebbekus, O. C. Erickson and A. Anderson.

The Allan-Diffenbaugh Wrench & Tool Co., Baraboo, Wis., which opened its factory about Jan. 1, has completed its first quantity output of 80,000 patented wrenches and purchased drop forgings for an additional 40,000 tools for immediate delivery, with orders for an equal number for later shipment. It is planning to take additional floor space and install several new tools, but no decision has been made.

The Northern States Casket Co., Chippewa Falls, Wis., has been incorporated with a capital stock of $25,000 to manufacture wood and metal caskets, handles and similar goods. The incorporators are H. C. Chapple, A. Carlson and F. E. Westlung.

The Board of Education, Kenosha, Wis., has engaged John D. Chubb, architect, Chicago, to design additions to two schools for junior high and vocational training. The estimated cost of each is $100,000.

The Wisconsin Textile Mfg. Co., Two Rivers, Wis., will build a new plant, 60 x 180 ft., with a separate power house and dry kiln, on a site 240 x 600 ft., acquired from the C. Reiss Coal Co. The capital stock is being increased from $50,000 to $150,000 to finance the new construction and equipment. It manufactures textile mill supplies, hardwood specialties, handles, manual tools, etc. Gustave C. Kirst is president and general manager.

The Board of Education, Durand, Wis., will build a junior high and vocational training school, two stories, 80 x125 ft., estimated to cost $100,000 with equipment. Plans are being prepared by Oppenhamer & Obel, architects, Wausau, Wis.

The Simple Gas Engine Works, Inc., Menasha, Wis., has amended its corporate articles to change the style to Menasha Clutch Pulley & Machinery Co. It will continue to manufacture small gas engines but devote principal attention to the production of transmission devices and appliances for tractors and engines.

The International Cultivator Co., New York, probably will take over and resume the operation of the works of the Termaat & Monahan Mfg. Co., Oshkosh, Wis., being the sole bidder for the property at receiver's sale on March 28. The bid is the equivalent of $90,000 and is now under consideration by the circuit court. G. H. Mueller, general manager of the defunct corporation, is receiver.

The Board of Education, Sturgeon Bay, Wis., is asking

bids until April 18 for the construction of a junior high and vocational training institute, designed by Oppenhamer & Obel, architects, Wausau, Wis., and estimated to cost $125,000. At the same time bids will close for a $90,000 addition to the East Division High School in the same city. John C. Acker is secretary of the board.

The Long Motor Co., 464 Park Street, Kenosha, Wis., has acquired a site on Sheridan Drive for a proposed new four-story garage, sales and service building, 50 x 150 ft., estimated to cost about $100,000. The architect is Charles O. Augustine, Kenosha.

The Molle Typewriter Co., Oshkosh, Wis., has reorganized on a broader scale and is succeeded by the Molle Typewriter Corporation, having an authorized capitalization of $2,500,000. The factory has been undergoing enlargement for several months and further increases in the capacity will be made. R. D. Wynn is president and general manager.

The Board of Education, Two Rivers, Wis., will be in the market in about 30 days for machinery and equipment for the manual arts department of the new Two Rivers High School, to be four stories, 180 x 240 ft. Construction contracts aggregate $410,000. The manual arts department will be equipped for machine and automobile repair work, sheet metal work, forging, mechanical drawing, printing, bench work in wood, etc.

Henry Powers, Chippewa Falls, Wis., has plans by Olson & Schaffer, local architects, for a two-story garage and machine shop, 66 x 82 ft., to cost about $20,000.

The Weise Laboratory Co., Manitowoc, Wis., established about six months ago to manufacture laboratory equipment and similar appliances, is disposing of $60,000 of its capital stock to finance the execution of several large contracts by the equipment of the factory space now available.

The Board of Education, Pulaski, Wis., is asking architects' competitive sketches for a proposed new $100,000 high school building, with manual training facilities. Plans will be considered April 17. E. A. Seymour is superintendent of schools.

California

SAN FRANCISCO, March 29.

After a little activity, which seemed to promise a gradual resumption of buyers' interest, the machinery market in this section has suffered a relapse the last week or two and now is very quiet. Inquiries have fallen off, and there is an apparent tendency to refrain from making purchases, probably in anticipation of lower prices. Except for a routine demand from Hawaii, foreign inquiries, especially from the Orient, are light.

The Victory Motor Co., Niles, Cal., manufacturer of oil engines and valves, has been reorganized as the Victory Mfg. Co. Charles S. James, H. J. James, E. W. McPherson, Arthur E. Biggins and W. S. Wellington are the incorporators. The new company will take over the San Francisco office and is planning to enlarge the Niles plant.

The Axelson Machine Co., San Fernando Street, Los Angeles, manufacturer of oil-well pumps, fittings and other machinery, has plans nearing completion for its new plant in the vicinity of Walsh and Elchelberger streets, St. Louis, totaling about six acres of land. The works, with machinery, is estimated to cost about $250,000.

The Pacific Rubber Ace Co., Los Angeles, has been incorporated with a capital of $250,000 by B. F. Jacobs, S. L. and C. R. Ploeser and H. W. Hanson to manufacture rubber products. The company is represented by Harry W. Hanson, 719 Van Nuys Building.

Considerable machinery will be installed in the new plant of the Western Cooperage Co., Fourteenth Street, San Francisco, to be located at Los Angeles. It will cost about $250,000 with equipment, and construction will begin at an early date.

The Pacific Clay Products Co., Los Angeles, has plans under way for the erection of a new plant in the vicinity of Los Neitos for the manufacture of firebrick and other refractory products. The initial output will total about 25,000 firebrick and refractory shapes per day and later will be increased to about 40,000 bricks. The plant is estimated to cost about $150,000 with machinery. E. M. Durant is president.

The Seacraft Corporation, Los Angeles Harbor, Los Angeles, operating a boat-building and repair works, is planning to rebuild its plant, destroyed by fire, March 25, with loss reported in excess of $100,000.

The All-In-One Co., 504 March-Strong Building, Los Angeles, manufacturer of metal products, is having plans prepared for new works at Slauson Avenue and Downey Road on a 10-acre site, recently acquired. The plant will comprise a one-story foundry, 200 x 200 ft.; pattern shop, 50 x 200 ft.; three-story enameling works, 75 x 200 ft.; one-story cleaning works for castings, 50 x 200 ft.; one-story assembling shop, 75 x 200 ft.; with warehouse, shipping department, offices, etc., and is estimated to cost about $350,000 with machinery. J. C. Peterson, Sacramento, Cal., vice-president of the company, is the architect.

The Pacific Spring Bed Co., 2326 Fourth Street, Berkeley, Cal., has awarded a contract to Barrett & Hilp, Sharon Building, San Francisco, for a two-story, reinforced-concrete addition to cost about $25,000.

The Leach-Biltwell Motor Car Co., Los Angeles, has been incorporated with a capital of $5,000,000 by G. M. Skidmore, F. R. Richardson, Harry Miller and R. A. Wilson to manufacture automobiles. The company is represented by N. A. Bille, 1041 Citizens' Bank Building.

The Hanford Iron Works, San Bernardino, Cal., has completed the installation of a new two-ton electric furnace and is said to be planning for the installation of similar equipment at a later date.

The Central South

ST. LOUIS, April 4.

THE IRON AGE is advised by Boone & Co., an investment house, Tulsa, Okla., of the organization in that city of the National Tool & Mfg. Co., capital stock $500,000, for the manufacture of the Winsell lock collar and other oil-well equipment. A site has been obtained in Tulsa for the plant, which will consist of a main building, 120 x 300 ft.; foundry, 60 x 150 ft.; office building, 20 x 50 ft. The company will also do a general manufacturing business in iron, steel and wood. Engineers who are laying out the plant have made up the following list of shop requirements, on which quotations are desired, and bids are also asked on equivalent equipment; also on factory buildings and building materials:

Tool Room

One No. 2 Kempsmith milling machine.
One Wilmarth & Morman precision grinder.
One 16-in. American lathe.
One 14-in. Barnes drill—one speed drill.
One Yankee driller grinder.
Drills, taps, dies, etc.

Machine Shop

Two 27-in. American lathes.
One 30-in. American lathe.
One 36-in. American lathe.
One 18-in. American lathe.
One universal horizontal boring mill.
One No. 3 Davis key seater.
One Jones slotter.
One Gould & Eberhardt 24-in. shaper.
One 6-ft. Niles-Bement-Pond boring mill.
One 8-ft. Niles-Bement-Pond radial drill.
One 4-ft. Niles-Bement-Pond radial drill.
One 18-in. Barnes drill.
One No. 4 Kempsmith Maximiller.
One Fellows No. 3 gear shaper.
Two threading or bolt and nut machines.
One Betts planer, 6 ft. between trees.
One 16-in. Gisholt lathe.
Two 24-in. Gisholt lathes.
One Milwaukee electric crane.
Tool holders, boring bars, etc., and fixtures for all of the above machines.

Blacksmith Shop

One 200-lb. steam hammer.
One 80-lb. steam hammer.
Two forges.
Two blast furnaces.
Two anvils; all necessary hand tools, swedge blocks, etc.
One hardening furnace or oven.
Two bulldozers or forming machines.
One bending machine.

Foundry

One cast-iron cupola.
One cast-steel cupola.
One brass crucible.
One aluminum crucible.
Ladles and carriers and all necessary flasks and tools.
One sanding machine.
One core making machine.

Pattern Shop

One band saw.
One circular saw.
One rip saw.
One crosscut saw.
One planer.
One mortising machine and all tools and equipment for pattern making, including paint and drying room.

Miscellaneous

All-steel stock rack for bars and flat steel.
Two floor cranes and portable work benches.
Two 30-hp. motors.
One 50-hp. boiler for hammers.
One 5-hp. motor for tool room.
One Cincinnati time recorder.
Milling cutters, turning and boring tools, reamers, drills, taps, dies, etc.
Two trucks for handling heavy castings.
One rattler for rough castings.
Line shafting, pulleys, hangers, etc.
One yard crane for unloading scrap and pig iron.
One platform scale for weighing pig iron and scrap.
One 72-in. ventilating fan, rear end, for foundry.
One 6-ft. Buffalo blower for cupolas.

One 2-ft. Buffalo blower for forges.
All dies for forging heads on bolts to be used in buildozers.
(These to be made in shop.)
One set Yale & Towne 2-ton chain falls.
One furnace for melting babbitt metal.

The Dependable Truck & Tractor Co., 231 Collinsville Street, East St. Louis, Ill., is completing plans for the erection of its new plant. The main building will be one-story, 100 x 250 ft., supplemented with a one-story power plant, and estimated to cost about $250,000 with machinery. Riester & Rubach, Murphy Building, are architects. C. V. Morse is president.

The Louis J. Doerr Motor Works Co., 3441 Juniata Avenue, St. Louis, recently organized, is planning the erection of a new one-story factory, 120 x 120 ft., for the manufacture of automobile parts and equipment, with general repair department. Louis J. Doerr is president, and J. J. Doerr, manager.

The Old Line Carriage Automobile Works, 447 South Campbell Street, Springfield, Mo., is planning for extensions and improvements to cost about $10,000.

In connection with the removal of its plant from Milburn, Ky., to Paducah, Ky., the Milburn Implement Mfg. Co. is planning for extensions in different departments, and new equipment will be installed at the Paducah works for the manufacture of harrows and other agricultural implements.

The Litchfield Shuttle Co., Southbridge, Mass., manufacturer of textile equipment, is planning for extensions in its plant at Newport, Ark., to increase the capacity from 40,000 to 50,000 shuttles per day. Considerable new machinery will be installed.

The Hazard Coal Co., Hazard, Ky., is planning the construction of a new coal tipple on property leased in this section.

The Missouri Car Co., Poplar Bluff, Mo., organized with a capital of $500,000, is planning the erection of a works for the manufacture of street railroad cars of one-man operating type. The Chamber of Commerce is interested in the project.

Fire, March 29, destroyed the cotton compressing plant of the Traders' Compress Co., Oklahoma City, Okla., with loss estimated at $650,000 including machinery and stock.

The Collapsible Wheel Co., Louisville, is reported to have closed negotiations for the purchase of the local plant of the Kentucky Iron & Steel Co., and will equip the works for the manufacture of metal rims for automobile wheels and other automobile equipment. About $100,000 will be expended for improvements and machinery.

The Vesper-Buick Automobile Co., 2550 Lindell Avenue, St. Louis, is completing plans for its new one-story automobile service and repair works, 100 x 210 ft., at Vandeventer and Pine streets, to cost about $75,000. P. J. Bradshaw, International Life Building, is architect.

The Nashville Enameling Co., Forty-second Avenue and Charlotte Pike, Nashville, Tenn., recently organized with a capital of $50,000, has plans under way for a new factory. It is proposed to have the structure ready for the machinery installation in July. Valentine Taylor is president.

The Echo Planing Mill Co., Pawhuska, Okla., Henry L. Smith and others interested, is in the market for about $30,000 of wood-working machinery.

The Crockwell Mine & Mill Supply Co., St. Louis, is in the market for one 22 or 24 x 48 Corliss engine.

The Gulf States

BIRMINGHAM, April 4.

The Standard Rubber Co., Mason Building, Houston, Tex., recently organized, has acquired the plant of the Universal Tire Co., which it will use for the manufacture of cord and fabric tires, and special rubber inner tubes. E. H. Fleming is president.

The Gaida Tractor & Implement Co., Ennis, Tex., recently organized, is planning for the installation of machinery in a local building for the manufacture of motor-driven tractors and parts. Later a department will be installed to increase the production of agricultural implements. T. E. Valek is president, and Wale Gaida, general manager.

The Invincible Oil Corporation, Fort Worth, Tex., operating refineries at Fort Worth and Shreveport, La., has arranged for a bond issue of $3,000,000, a portion of the proceeds to be used for expansion. J. B. Shearer is vice-president.

The Dexter-Geare Corporation, Miami, Fla., has acquired a local site and has plans under way for a new factory to manufacture concrete products. A one-story machine shop will also be constructed.

The Vanstory Mowing Machine & Cutters Co., Rienzi, Miss., recently organized, with a capital of $1,000,000, will operate a local plant for the manufacture of mowing machines and mowing machine cuters. It is headed by W. J. Vanstory and B. W. Burnett.

A. G. Rogers, Starke, Fla., is organizing a company to erect a factory for the manufacture of measuring and other instruments for builders.

Stringer Brothers, Gadsden, Ala., will erect a new one-story building at their plant, recently acquired, for foundry service. They will specialize in the manufacture of brass and iron plumbing fittings, and it is planned to develop a capacity of about 30 tons of material a day. A. E. Stringer is head.

Gordon Hall, Gadsden, Ala., is planning for extensions in his brick plant, recently acquired. A number of buildings will be extended and improved, and new machinery installed. Electric operation will be arranged in different departments.

The Arcadia Auto Top Co., Arcadia, Fla., is planning for the establishment of a new factory for the manufacture of automobile tops and similar equipment. Thomas Alderman is head.

The Daytona Sheet Metal Works, Daytona, Fla., will establish a machine shop. E. H. Blank is manager.

The Moseley Tie Plate Rail Anchor Co., Meridian, Miss., J. C. Moseley and others interested, is in the market for about $20,000 worth of metal working equipment to manufacture tie plate rail anchors.

The Moore Iron Works, Inc., El Paso, Tex., is in the market for a second-hand Napier metal cutting machine and a machine for crimping and cutting wire.

Canada

TORONTO, April 4.

While demand for machine tools has fallen off the past week, dealers are finding more activity in wood-working equipment and some good orders have recently been booked. Second-hand tools are in fair demand, as users are reluctant to buy new equipment when used machines will answer the purpose.

The Laing Produce & Storage Co., Ltd., Water Street East, Brockville, Ont., will erect a factory for the manufacture of tin cans, etc., and is interested in prices of equipment.

The Carter White Lead Co. of Canada, Delorimer Avenue, Montreal, will build an addition and install new machinery.

J. A. Laxton, 6 Ridley Gardens, Toronto, has the general contract for addition to the plant of the American Watch Case Co., Toronto, 511 King Street West, to cost $20,000.

The Montreal Light, Heat & Power Co., 83 Craig Street West, Montreal, has awarded contract for the erection of power house to cost $80,000 to the MacKinnon Steel Co., Ltd., Drummond Road, Sherbrooke, Que.

The establishment of a wheel-making plant, at a cost of $150,000, is contemplated by the Canada Iron Foundries, Ltd., Fort William, Ont., as a subsidiary to its present works.

The Trenton Cooperage Mills, Ltd., Trenton, Ont., is in the market for a second-hand, four-cycle, 18- or 20-hp. marine gasoline engine, complete with fittings.

The General Truck & Auto Sales, Ltd., Walkerville, Ont., has been incorporated with a capital stock of $200,000 by Howard E. Blood, Charles D. Donaven, William J. Davidson and others to manufacture automobiles, motor trucks, farm implements, etc.

The Hubbard Portable Oven Co. of Canada, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by James W. Bicknell, 6 Adelaide Street East; John F. Lucas, 89 Willcocks Street; William O. Gibson and others to manufacture bakers' ovens, supplies, etc.

H. B. Moore, Ltd., Toronto, has been incorporated with a capital stock of $200,000 by Samuel King, 67 Yonge Street, Walter D. Smith and others to manufacture motor vehicles, trucks, accessories, etc.

The Smith Electric Co., Ltd., Sarnia, Ont., has been incorporated with a capital stock of $40,000 by Harry W. Smith, Leonard H. Darbyshire, Sarnia, Ont.; Frank O. Smith, Petrolea, Ont., and others to manufacture electrical machinery, equipment, etc.

The Brantford Oven & Rack Co., Ltd., Brantford, Ont., is increasing its capital stock from $50,000 to $200,000.

The Coffield Washer Co., Canada, Ltd., Hamilton, Ont., has been incorporated with a capital stock of $50,000 by Harry Bloom, Walter C. Britain, both of Hamilton; James L. Coffield, Dayton, Ohio, and others to manufacture washing machines and other devices.

John B. Smith & Sons, Toronto, are in the market for an 18- to 25-ton saddle tank locomotive.

The Huntsville Lumber Co., Huntsville, Ont., is in the market for an engine, gasoline preferred, for switching loaded cars.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	3.23c. to 3.58c.
Swedish bars, base price	15.00c.
Soft steel bars, base price	3.23c. to 3.58c.
Hoops, base price	4.33c. to 4.38c.
Bands, base price	3.93c. to 4.28c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.33c. to 3.68c.
Channels, angles and tees under 3 in. x ¼ in., base	3.23c. to 3.58c.

Merchant Steel	Per Lb.
Tire, 1½ x½ in. and larger	3.23c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.43c.
Toe calk, ½ x ⅜ in. and larger	3.75c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.50c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.73c.
Squares, flats and hex	5.23c.
Standard cast steel, base price	15.00c.
Best cast steel	20.00c.
Extra best cast steel	25.00c.

Tank Plates—Steel

¼ in. and heavier ..... 3.33c. to 3.88c.

Sheets

Blue Annealed	Per Lb.
No. 10	4.00c. to 4.23c.
No. 12	4.05c. to 4.28c.
No. 14	4.10c. to 4.33c.
No. 16	4.20c. to 4.44c.

Box Annealed—Black

	Soft Steel C.R., One Pass Per Lb.	Wood's Refined, Per Lb.
No. 18 to 20	5.05c. to 5.18c.	.....
Nos. 22 and 24	5.10c. to 5.23c.	6.05c.
No. 26	5.15c. to 5.28c.	6.15c.
No. 28	5.00c. to 5.38c.	6.25c.
No. 30	5.50c. to 5.63c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized	Per Lb.
No. 14	5.00c. to 5.38c.
No. 16	5.25c. to 5.63c.
Nos. 18 and 20	5.40c. to 5.78c.
Nos. 22 and 24	5.55c. to 5.93c.
No. 26	5.70c. to 6.08c.
No. 27	5.85c. to 6.23c.
No. 28	6.00c. to 6.38c.
No. 30	6.50c. to 6.88c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt...	—46	—30	¾-1½ in. Butt.	—13	+ 6
¾-3 in. Butt.	—50	—35	2 in. Lap.....	— 8	+10
3½-6 in. Lap.	—43	—29	2½-6 in. Lap..	—10	+ 5
7-12 in. Lap..	—35	—19	7-12 in. Lap....	list	+16

Steel Wire

BASED PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	5.25c.
Annealed soft	5.25c.
Galvanized annealed	6.00c.
Coppered basic	5.75c.
Tinned soft Bessemer	6.75c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18 c. to 21 c.
High brass wire	19¼c. to 21¾c.
Brass rod	17 c. to 20¾c.
Brass tube, brazed	32 c. to 35¾c.
Brass tube, seamless	21½c. to 23½c.
Copper tube, seamless	22½c. to 24½c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21½c. to 22c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$7.80	$7.55
		90 lb....	7.90	7.65
		100 lb....	8.00	7.75
IC.. $12.00	$10.75	IC....	8.15	7.90
IX.. 13.75	12.25	IX....	9.15	8.90
IXX.. 15.25	13.75	IXX....	10.15	9.90
IXXX.. 16.50	15.08	IXXX....	11.15	10.90
IXXXX.. 18.00	16.25	IXXXX....	12.15	11.90

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$8.35
IC	8.50
IX	9.50
Fire door stock	11.50

Tin

Straits pig	32c.
Bar	36c. to 38c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	12c. open 13c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6 c. to 7 c.
Solder, ½ and ½ guaranteed	23c.
No. 1 solder	21½c.
Refined solder	17½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	80c.
Commercial grade, per lb.	40c.
Grade D, per lb.	35c.

Antimony

Asiatic ..... 6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.... 32c. to 35c.

Old Metals

Business is quiet but prices are fairly firm. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.25
Copper, heavy and wire	9.25
Copper, light and bottoms	7.75
Brass, heavy	6.00
Brass, light	4.75
Heavy machine composition	9.75
No. 1 yellow brass turnings	5.00
No. 1 red brass or composition turnings	7.75
Lead, heavy	3.50
Lead, tea	2.50
Zinc	2.75